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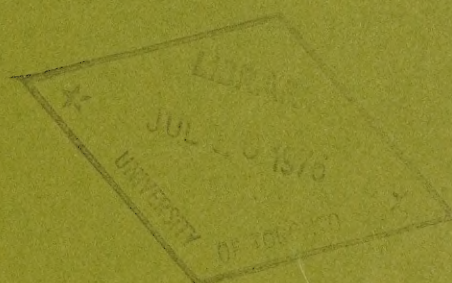
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Report of the Timber Revenue Task Force to the Treasurer of Ontario and the Minister of Natural Resources

OCTOBER, 1975



Ontario

REPORT
OF THE
TIMBER REVENUE TASK FORCE
TO THE
TREASURER OF ONTARIO
AND THE
MINISTER OF NATURAL RESOURCES

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October, 1975

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EXECUTIVE SUMMARY

In his 1974 Budget, the Treasurer of Ontario announced changes which doubled the Provincial revenue from Crown dues. This was the first major revision of the dues schedule since 1951. The changes introduced in the 1974 Budget were intended as an interim measure pending a complete review of the timber resource revenue field to be conducted by a task force under the joint direction of the Treasurer and the Minister of Natural Resources. The Treasurer's 1974 Budget Statement indicated specifically that, "It is our intention to implement a system which will be more responsive to changes in forest company profits, revenue rising with increasing profits and declining with decreasing profits".

The Timber Revenue Task Force was formed with three members from the Ministry of Natural Resources, one from the Ministry of Revenue and three from the Ministry of Treasury, Economics and Intergovernmental Affairs. The Task Force met on a regular basis and conducted its investigation over a period of eight months. Throughout this review, meetings were held with private sector groups to solicit comments and their reaction to this investigation.

This summary brings together the major findings of the Task Force and explains the thinking and research in support of its recommendations.

Approximately 90% of the forested land in Ontario is owned by the Province and the responsibility to maintain and administer this resource rests with the Ministry of Natural Resources. For many years the primary instruments employed by the Province to receive compensation from individuals or companies harvesting and using Crown timber have been tenure charges, stumpage charges and a logging tax which was repealed in 1972.

(a) Tenure Charges currently consist of:

1. Management charge (\$2.00 per square mile of productive area per annum)
2. Forest protection charge (\$25.60 per square mile of productive area per annum)

Both of these charges are employed on land under licence to companies or individuals. These rates have been in effect since 1968.

(b) Stumpage charges consist of:

1. Crown dues (a schedule of charges based on species, quality and quantity of wood cut, representing the minimum stumpage)
2. Bonus (a bonus over and above the Crown dues may be negotiated between licensee and the Province to reflect geographic advantages or superior quality timber)
3. Bid (in the case of a few sales licences a competitive bid over and above the Crown dues and bonus is collected)

Timber Revenue Distribution

(\$000's)

<u>Fiscal Year</u>	<u>Tenure Charges at \$27.60/ Productive Sq. Mile</u>	<u>Crown Dues</u>	<u>Bonus & Bid</u>	<u>Total</u>
1972-73	2,071	13,900	1,903	17,874
1973-74	2,025	15,480	1,970	19,475
1974-75	2,135	24,390*	2,776	29,301

* New rates in effect for only 11 months.

In the past the above charges for harvesting the Crown timber were set on a more or less "ad hoc" basis and once set these rates tended to remain in force for many years without revision.

This pricing policy was deficient in the following ways:

1. It was not sufficiently responsive to the industry's cyclical pattern.
2. It did not adequately compensate the Province for the use of this resource.
3. It did not encourage maximum utilization of the timber resource.

In its investigation the Task Force sought to overcome these deficiencies. The report focuses on two principal issues:

1. WHAT IS AN APPROPRIATE LEVEL OF CHARGE FOR THE USE OF CROWN TIMBER? AND,
2. WHAT IS THE FAIREST AND MOST EFFICIENT METHOD OF COLLECTING SUCH TIMBER REVENUE?

In determining an appropriate level of charge, three factors were considered:

- . The industry's ability to pay;
- . The level of charges in other jurisdictions; and
- . The costs incurred by the Ministry of Natural Resources in regenerating and managing the forests in the province.

Ideally the Province should structure the level of charges to recover its costs plus a return; however, the former two factors place a constraint in achieving this objective.

The nature of Ontario's forest industry was studied and the main features were found to be the following:

- . It is an export-oriented industry and therefore insensitive to domestic fiscal measures.
- . The industry in general, and the sawmilling sector in particular, performs in a very cyclical pattern.
- . The industry is an important element of Ontario's economy, especially when viewed in a regional context. Forest-based industries account for approximately 63% of the total employment in goods-producing industries in the northwestern region and 20% in the northeastern region of the province.
- . Much of the industry is labour intensive; however, rapidly escalating labour costs are leading to greater mechanization.
- . An important development within the industry is a trend towards greater integration and concentration.

To determine the optimal mechanism of collecting the desired level of revenue a number of alternatives were analysed in depth, including methods used in other jurisdictions. The most promising of these alternatives were also empirically tested over a business cycle in order to evaluate their dynamic performance.

Based on these considerations and analyses the Task Force agreed on the following set of recommendations:

1. FOR THE FISCAL YEAR 1976-77 THE TARGET LEVEL OF REVENUE SHOULD BE \$40 MILLION.
 - . This target level of revenue assumes a harvest equal to the average of the 1972-73, 1973-74 and 1974-75 harvest, and that the forest industry will be operating at normal levels; that is, neither in the boom nor bust phase of its cycle.

2. TO COLLECT THIS LEVEL OF REVENUE THE PRESENT SYSTEM SHOULD BE RETAINED WITH THE FOLLOWING MODIFICATIONS :
 - . A single tenure charge should be established replacing the existing forest protection and management charges. The new tenure rate should be established to recover an amount equivalent to 10% of the desired revenue.
 - . The negotiated bonus and the bid, in the case of tendered timber sales, should also be retained, but their role should receive greater emphasis with the objective of generating 10% of the desired revenue.
 - . The remaining 80% should be collected through a set of Crown dues. The Crown dues, representing the minimum charge for the harvest of timber, should continue to be based on the same six classes and rate structure as at present.
3. THE TENURE CHARGE SHOULD BE INCREASED ANNUALLY AT THE RATE OF 10%.
4. THE CROWN DUES SHOULD BE INDEXED MONTHLY USING A THREE MONTH MOVING AVERAGE OF THE INDUSTRY SELLING PRICE OF THE PRODUCT FOR WHICH THE TIMBER IS USED.
5. A COMPLETE REVIEW SHOULD BE UNDERTAKEN AFTER EACH FIVE-YEAR PERIOD TO ESTABLISH A NEW COST BASE AND REASSESS THE INDUSTRY'S ABILITY TO PAY.

The target level of revenue being recommended represents an increase of less than 1%, in real terms, over the level established by the 1974 revision. This level of **charges** would maintain Ontario's competitive position vis-a-vis the other provinces.

The system being recommended to raise this revenue does not represent a radical departure from the existing system. Basically, the recommendation is to retain the present system with some modifications introduced to achieve the desired results.

- . A single tenure charge replacing the existing forest protection and management charges will simplify the system.
- . A higher level of tenure charge will encourage companies to surrender any land under long term licence that is beyond their anticipated requirements.
- . Increasing the revenue from the negotiated bonus and bid will serve to better reflect geographic advantages and quality of timber thus producing a fairer overall distribution among companies.
- . The indexing mechanism will serve two purposes. First, it will protect Government revenue from inflation. Second, it adjusts the charges in response to the cyclical nature of the industry. For example, a 10% drop in the price index will result in a 10% drop in the level of Crown dues.

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PREFACE

In his 1974 Budget the Treasurer of Ontario announced changes which doubled the Provincial revenue from Crown dues. This was the first major revision of the dues schedule since 1951. The changes introduced in the 1974 Budget were intended as an interim measure pending a complete review of the timber resource revenue field, to be conducted by a task force under the joint direction of the Treasurer and the Minister of Natural Resources. The Treasurer's 1974 Budget Statement indicated specifically that "It is our intention to implement a system which will be more responsive to changes in forest company profits, revenues rising with increasing profits and declining with decreasing profits".

The Timber Revenue Task Force was formed with three members from the Ministry of Natural Resources, one from the Ministry of Revenue and three from the Ministry of Treasury, Economics and Intergovernmental Affairs, and began meeting at the end of October, 1974.

The Terms of Reference charged the Task Force to :

1. Review all revenues derived from timber resources.
2. Report on the cyclical nature of the industry and the importance of the industry to the Ontario economy.
3. Recommend a system or alternative systems of revenue-generating instruments that will increase pre-1974 budget revenue from the industry while at the same time providing a basis for long-term growth and stability.

Originally it was intended that the Task Force would complete its review and make its recommendations to the Treasurer and the Minister of Natural Resources in time for the recommendations to be considered for inclusion in the 1975 Budget. However, once commenced it became evident that a thorough review would require an extension of the reporting date to October.

In its review the Task Force received assistance from other staff members of the three ministries involved. In addition, the Task Force held a number of meetings with and received information and comments from individual industry representatives, the Ontario Forest Industries Association and the Ontario Lumber Manufacturers' Association. It would be unrealistic to expect all of those who assisted the Task Force to concur with every aspect of the recommendations in this report. However, the Task Force benefited greatly from their cooperation, and to them we express our gratitude.

Timber Revenue Task Force:

A. SALERNO, Chairman
D. P. DRYSDALE
P. HYMAN
G. MORE
D. SALIE
M. L. SIMPSON
D. VAN DALEN

SUMMARY OF ANALYSIS AND RECOMMENDATIONS

The report addresses two issues :

1. WHAT IS AN APPROPRIATE LEVEL OF CHARGE FOR THE USE OF CROWN TIMBER? AND,
2. WHAT IS THE FAIREST AND MOST EFFICIENT METHOD OF COLLECTING SUCH TIMBER REVENUE?

In answering the issue of an appropriate level of charge, an objective approach was taken. That is, the recommendation on the level of charge was based on the costs incurred by the Ministry of Natural Resources in regenerating and managing the forest of the province, on the industry's ability to pay, and on the level of charges in other jurisdictions. To establish the industry's ability to pay, such factors as the cyclical nature of the industry, its competitive position, its existing tax burden and profitability, and the industry's economic importance to the province were studied.

The approach taken to answer the issue of what is the optimal mechanism to collect the desired level of revenue was to study the broad range of alternative revenue-generating systems, particularly those in use in other provinces. From this group of alternatives the least promising in terms of satisfying the specified criteria were eliminated. The alternatives in this smaller set were empirically tested over a business cycle to evaluate their performance.

Based on the above considerations and analysis the following recommendations are made :

1. FOR THE FISCAL YEAR 1976-77 THE TARGET LEVEL OF REVENUE SHOULD BE \$40 MILLION.
 - . This target level of revenue assumes a harvest equal to the average of the 1972-73, 1973-74 and 1974-75 harvest, and that the forest industry will be operating at normal levels; that is, neither in the boom nor bust phase of its cycle.
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 - . The negotiated bonus and the bid, in the case of tendered timber sales, should also be retained, but their role should receive greater emphasis with the objective of generating 10% of the desired revenue.
 - . The remaining 80% should be collected through a set of Crown dues. The Crown dues, representing the minimum charge for the harvest of timber, should continue to be based on the same six classes and rate structure as at present.
3. THE TENURE CHARGE SHOULD BE INCREASED ANNUALLY AT THE RATE OF 10%.
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5. A COMPLETE REVIEW SHOULD BE UNDERTAKEN AFTER EACH FIVE-YEAR PERIOD TO ESTABLISH A NEW COST BASE AND REASSESS THE INDUSTRY'S ABILITY TO PAY.

INTRODUCTION

Approximately 90% of the forested land in Ontario is owned by the Province and the responsibility to maintain and administer this resource rests with the Ministry of Natural Resources. Since the early 19th century, the Government has conferred, in one form or another, the right to harvest Crown timber to private concerns. In 1897, the many regulations concerning the allocation of timber were codified in The Crown Timber Act.

Over the years the quantity of wood demanded and the manner by which the industry has acquired Crown timber has changed. The alternative and sometimes conflicting uses of forest resources have continued to increase in importance and the costs of managing the forests have increased significantly.

These developments have created a need to reassess the Government's "pricing" policy for this resource on a more regular basis. In the past the "prices" charged for the harvesting of Crown timber were set on a more or less 'ad hoc' basis. They would remain fixed for long intervals, then periodically they would be substantially revised during a period of review.

In discharging the responsibility given the Task Force by its Terms of Reference, two basic issues had to be addressed :

1. What is an appropriate level of charge for the use of Crown timber? and,
2. What is the fairest and most efficient method of collecting such timber revenue?

This Report makes recommendations on both the level of revenue that the Province should collect from the harvesting of Crown timber and how best this level of revenue may be collected.

In addition, evidence and analysis are presented to support these recommendations. Specifically, Chapter 1 reports on The Nature of Ontario's Forest Industry, its past and present structure and future trend. It is widely recognized that the forest industry is an important part of the Ontario economy; several measures to assess this importance are presented. The industry's ability to pay for its raw material is dependent on the industry's profitability (which in turn is strongly influenced by cyclical fluctuations). An investigation of these aspects is presented in this Report.

Chapter II, The Cost of Forestry in Ontario, presents the requisite data and discusses approaches in determining the costs of forest management in Ontario.

Chapter III, Review of Timber Revenue Systems, describes possible alternative approaches to charging for Crown timber. The approaches applied by other jurisdictions competing with Ontario's industry, namely the other major wood-producing provinces, the U.S. and the Scandinavian countries, are briefly reviewed and the current Ontario system is presented in greater detail.

Chapter IV, Evaluation of Alternative Revenue Generating Systems, presents criteria generally used in the evaluation of alternatives. These criteria are then used to select certain revenue-generating alternatives for further tests. Based on the test results the approaches are evaluated.

Chapter V, presents the Task Force Recommendations.

The specific models used in testing alternative systems are presented in the Appendix.

A separate statistical document was produced and utilized by the Task Force in its various analyses. For the dual purposes of avoiding the difficulties of confidentiality and an overly cumbersome report, this data is not extensively reproduced within the Report. However, liberal reference to the major primary data sources is made throughout the text.

I. THE NATURE OF ONTARIO'S FOREST INDUSTRY

As an integral part of its examination of the Provincial system of charges for the harvesting of Crown timber, the Task Force deemed essential a review of the economic nature of the forest industry in Ontario.

The term 'forest industry' is generally understood to include Logging, the Wood Industries, and the Paper and Allied Industries group, as defined in the Standard Industrial Classification of Statistics Canada. The main sectors¹ of the industry are listed below.

THE FOREST-BASED INDUSTRY

<u>Industrial Sectors</u>	<u>S.I.C. No.</u>
Logging	031
Sawmills and Planing Mills	2513
Veneer and Plywood Mills	252
Pulp and Paper Mills	271

1.

Downstream manufacturing activities excluded from this study include sash, door and wooden box factories, asphalt roofing and paper box and bag manufacturers.

Most major industrial operations in Ontario are dependent on Crown timber. Industry data however does not distinguish between private or Crown timber consumed in manufacturing. Therefore, while this chapter is intended as a background for questions dealing specifically with Crown timber, it examines the industry in its entirety.

Survey data collected by Statistics Canada was selected as the primary reference source for this review. While there are some inadequacies in industrial statistics based on the Statistics Canada survey technique it was felt that consistency in terminology , measurement and accessibility provided by this source were of prime importance.

A seven-year study period, 1966 - 1972, was chosen since a complete set of more recent data was not available at the time of writing. In addition, it was felt that this period adequately represented the industry at several of its higher and lower points.

A detailed statistical review of the industry during the period 1966 - 1972 was prepared as a separate working paper. Reference to the original data source is made throughout the text, and tables are presented where relevant.

Ten primary topics were chosen for examination :

- | | |
|---------------------------|-----------------------------|
| 1. Industrial Structure; | 2. Costs; |
| 3. Productivity; | 4. Markets; |
| 5. Common Issues; | 6. Provincial Significance; |
| 7. Regional Contribution; | 8. Cyclicity; |
| 9. Profitability; and | 10. Tax Burden. |

Industrial Structure

Logging

The forest industry of Ontario harvests timber on both private and Crown land and Table 1 presents a breakdown of the total provincial harvest, by sources, for the period 1966-1972.

TABLE 1

Wood Harvested in Ontario, 1966-1972

Year	Total Harvest (000 Cunits)	% of Total Harvest taken from Crown Land	% of Total Harvest taken from Private Land
1966	6091	63.3%	36.7%
1967	6071	69.7%	30.3%
1968	5910	72.7%	27.3%
1969	6217	63.7%	36.3%
1970	5933	72.6%	27.4%
1971	5593	70.8%	29.2%
1972	6131	63.6%	36.4%

SOURCE: Statistics Canada, Cat. No. 25-201

A substantial portion of this Crown timber harvest in Ontario is undertaken by loggers acting as sub-contractors to licence holders. Completely independent loggers directly account for only a small proportion of the total wood cut in Ontario.

Sawmills

Through the early 1960's a major portion of Ontario lumber production originated from small, seasonal sawmill operations. With the increasing returns to lumber production, rising costs of capital and unionization of wood operations, permanent sawmills of an annual capacity larger than 25 million board feet began to account for a greater share of production. Associated with the increasing average scale of plant was a pronounced decline in the number of workers employed (13% over the period 1966-1972) and the number of establishments (23% over the same period).

The trend towards larger capacity sawmills has been emphasized by the recent entry of nearly all major pulp and paper companies into sawmilling. By 1973, 27% of total lumber production came from sawmills owned or controlled by pulp and paper firms. The major reason for this movement of pulp and paper operations into sawmilling has been their increasing demand for wood chips for pulping operations. While the volume of pulp chip deliveries in Ontario is less than in Quebec and much smaller compared to that in British Columbia, the average

annual increase of some 15% is witness to the growing integration of sawmill and pulp and paper mill operations. Further, the increasing proportion of total shipment value accounted for by deliveries of pulp chips reflects their increasing attraction as a stabilizing revenue source for sawmills. In times of depressed lumber markets, chip production can generate valuable revenue. While the total value of goods shipped by sawmills declined in 1967 and 1970, the value of pulp chip deliveries increased in both years. In 1972, pulp chips accounted for approximately 9% of the total value of goods shipped by sawmills.

The limiting factor to a continuing increase in shipments of pulp chips by sawmills is the absolute availability of wood. To date, almost all chip production has been from sawmill residue. This source of chips is related to the volume of lumber produced. In the future there will be increasing difficulty in obtaining raw timber sufficient for the production of both lumber and pulpwood, as the province's surplus timber supply declines.²

Pulp and Paper Mills

Except for four establishments, all pulp and paper operations in Ontario are multi-product facilities or single-product subsidiaries of diversified forest-product firms.

Currently, pulp production capacity in Ontario is approximately 15,000 tons per day. The majority of this capacity

2. The timber supply constraint on the increase in forest industry production in Ontario is described on page 26.

is devoted to kraft and groundwood pulp production.

Approximately 23% of capacity is classified as producing market pulp for sale on the open market. The remaining 77% of pulp capacity is, ostensibly, devoted to supplying foreign or domestic further processing (paper and paperboard) facilities associated with the producing mill.

There is approximately 11,000 tons per day of paper and paperboard producing capacity in Ontario. Some 57% of this processing capacity is devoted to newsprint production. The remaining 43% is divided fairly equally amongst fine paper, paperboard and wrapping and corrugated medium production.

An age profile for pulp and paper facilities in Ontario was constructed on the basis of the facility age of 25% of pulp capacity and 30% of further processing capacity. For the sample facilities, the average age is 38 years for pulp and 44 years for paper. Given the high capital costs of pulp and paper equipment, established facilities in Ontario have, to date, generally opted for programs of plant expansion and equipment maintenance rather than facility replacement. This fact seems to be corroborated by an

examination of capital and repair expenditures on plant and equipment by paper and allied industries in Ontario. Annual capital expenditures by this group, over the seven-year period 1966-1972, averaged 60% of total capital and repair expenditures. By comparison, the industry in the rest of Canada devoted 70% of expenditures to capital and the aggregate of all manufacturing industries in Ontario spent more than 65% of total investment expenditures on capital.

While the volume of pulp and paper production in Ontario has fluctuated from year to year, the absolute change in production of both pulp and paper and paperboard over the period 1966 - 1972 was a 10% increase. The aggregate value of goods shipped increased 25% over the six-year period, although shipments dropped in 1971. Employment over the same period declined 5%.

Industry Integration

As mentioned, there is an increasing degree of integration within Ontario's forest-based industry. Table II details the operational capacities of the seven forest industry firms which are fully-integrated within Ontario. For the year 1973, these seven firms and their subsidiaries :

- . held 73% of the total productive Crown forest land which was under licence;

Operational Capacities of Forest Product Firms, Fully-Integrated in Ontario: 1973

TABLE II

Company	Productive Licensed Area (% of Total Prod. Area Licensed) Square Miles	Total Cut 1973 of Cut on Crown Land) Cunits	Sawmill Capacity (% of Total Sawmill Cap.) M.B.M.	Pulp Capacity (% of Total Pulp Capacity) Tons/Day	Paper, Board, and Other Capacity (% of Total Paper, Board & Other Capacity) Tons/Day
Abitibi Paper Co. Ltd., and Abitibi Provincial Paper Ltd.	11,274.5 (15.4%)				
Reed Paper Ltd.	6,872.9 (9.4%)				
Domtar Ltd.	4,710.7 (6.4%)				
Kimberly-Clark of Canada Ltd. and Spruce Falls Power & Paper Co. Ltd.	10,777.7 (14.7%)				
E. B. Eddy Co. and Eddy Forest Products Ltd.	4,017.6 (5.5%)				
Great Lakes Paper Co. Ltd.	10,757.8 (14.7%)				
Ontario-Minnesota Pulp and Paper Co. Ltd.	5,076.1 (6.9%)				
Total All Fully Integrated Firms	53,487.3 (72.9%)	2,302,607 (48.9%)	310,246 (23.4%)	12,945 (89.8%)	9,396 (79.8%)

Source: Ministry of Natural Resources

C O N F I D E N T I A L

- . accounted for 49% of the total harvest of Crown timber;
- . owned or controlled 23% of sawmill capacity in the province;
- . owned or controlled 90% of pulp production capacity; and
- . owned or controlled 80% of pulp processing capacity.

Co-operation among these seven major firms and between them and independent sawmillers is further promoted by Third Party Cutting Agreements. These agreements allow sawmillers to harvest sawlogs, not required by pulp mills, from acreage under prime licence to the pulp mill.

The degree of integration and concentration present at almost all levels of Ontario's forest-based industry has led to the exercise of a degree of oligopoly power, as witnessed by the current price strategy of pulp and paper producers. Rather than reduce prices in the face of the current market downturn, Ontario pulp and paper producers have turned to temporary shutdowns and operational cutbacks to soften financial pressures. It should be noted, however, that this appears to be a general policy of the pulp and paper industry, both nationally and internationally.

The benefits of concentration and integration within the industry manifest themselves in efficiency and productivity

of operation, greater wood utilization, and greater export revenues during periods of buoyant markets.

An investigation of the costs and benefits of a competitive industrial structure is beyond the scope of this Report. However, it can be noted that during the previous pulp and paper market downturn in 1970 - 1971, Ontario producers turned to price competition in an attempt to maintain sales. This strategy was unsuccessful and major shutdowns and personnel layoffs occurred.

Costs

In the preceding examination of the structure of the Ontario forest-based industry, operating costs were not explicitly considered. Table III presents an average breakdown of factor-input costs over the period 1966-1972 for logging, sawmilling and pulp and paper mill operations.

The period 1966-1972 does not take account of two major influences on the factor-input costs of the forest-based industries. These are the escalation of energy costs occurring from 1973 to 1975, and the effective doubling of Provincial revenue from Crown dues which was initiated in 1974. Quantitative measurements of the impact of these events on industry costs are not available; however, pulp and paper producers, as the most energy-intensive of the three groups, are the most vulnerable to increased energy costs.

TABLE III
Percentage Breakdown¹ of Factor-Input
Costs of Forest-Based Industry in Ontario

Industrial Group	Wage Costs	Purchased Fuel and Electricity	Wood Costs ²	Other ³
Logging	50.4%	4.7%	9.9%	35.0%
Sawmills	31.5%	3.3%	44.8%	20.4%
Pulp and Paper Mills	26.4%	9.9%	32.1%	31.6%

SOURCE: Statistics Canada, Catalogue Nos. 25-201, 35-204
35-206, 36-204

1. This percentage breakdown is based on the average composition of factor-input costs over the period 1966-1972.
2. Wood costs include stumpage paid. In the case of logging, direct wood costs are considered to be stumpage only.
3. Other costs include payment for work done by others, materials other than wood and maintenance.

Logging

Wages were the major factor-input cost for logging in Ontario over the period 1966-1972. Operating and maintenance expenditures, sub-contracting fees, and private and Crown charges for wood followed in declining order of importance.

Stumpage and other charges for wood averaged approximately 10% of total factor-input costs over the period 1966-1972.

Stumpage declined in importance as a factor-input at an annual

rate of approximately 3%. Stumpage and other wood charges were 7.8% of the total factor-input costs in 1972.

Sawmills

Wood costs other than stumpage were the leading factor-input (45%) for sawmill operations in Ontario over the period 1966-1972. Wages were the second largest component and stumpage was the smallest component, averaging less than 1% of total factor-input costs.

Pulp and Paper Mills

Wood costs remained the primary factor-input cost for pulp and paper mills in Ontario over the seven-year study period. While the portion of total costs accounted for by total wood acquisition varied little over the period, expenditures on pulpwood declined as the use of chips in pulping increased.

While the acquisition of wood remained the major cost component in paper production, the share of total costs accounted for by wages increased some 2% per year over the seven-year period, to 27% of total factor-input costs in 1972.

General

The foregoing has dealt with component factor-inputs to the forest-based industry on the basis of their weight in total costs, and labour appears to be the primary industry input.

Wood costs, as a factor-input, in sawmills and particularly in pulp and paper mills is largely composed of payments for

stumpage, labour and transportation which have been incurred up to the point at which the mill purchases its wood supplies. As such, the bulk of this item can be distributed and recategorized into the other factor-input classifications. Stumpage charges for Crown wood represent a relatively small component of total cost for the forest-based industries, approximating 2% of total factor-input costs.

Productivity

Table IV presents indices of productivity per man-hour-paid in the forest-based industry.

TABLE IV

Indices of Productivity in Ontario's
Forest-Based Industry: 1966-1972

Year	Logging ¹	Sawmills ²	Pulp ³ Production	Paper ³ Production
1966	100	100	100	100
1967	109	91	103	101
1968	104	99	106	104
1969	118	101	111	107
1970	118	102	114	110
1971	135	117	117	116
1972	151	119	120	119

SOURCE : ~~Statistics~~ Canada, Cat. Nos. 25-201, 25-202, 36-204

1. Productivity measured in cunits harvested per man-hour-paid.
2. Productivity measured in thousand board foot of production per man-hour-paid.
3. Productivity measured in tons produced per man-hour-paid.

Logging

The trend towards larger, more mechanized logging operations is reflected in the increased productivity of woods operations in Ontario. Cunits cut per man-hour-paid increased some 50% over the period 1966-1972. This increase in productivity per man-hour-paid was matched by an average annual increase in wages paid per man-hour of 9.5% annually or 72% over the period 1966-1972.

Sawmills

The movement of pulp and paper mills into sawmilling and the increasing proportion of production accounted for by larger sawmill units is reflected in an increase in productivity per man-hour-paid of 19% over the period 1966-1972. Wages paid per thousand board foot of lumber increased approximately 46%, an average rate of 6.5% annually for the seven-year period. Hourly wages thus increased 10% per year on average from 1966 - 1972.

Pulp and Paper Mills

Productivity in pulp and paper production increased approximately 20% over the period 1966-1972. This increase in productivity per man-hour-paid was associated with increases of 28% in wages paid per ton of pulp and 30% in wages per ton of paper and paperboard produced. Hourly wages thus increased 55%, or 7.5% per year, over the seven-year period.

Markets

Table V presents the disposition of goods shipped by Ontario's forest-based industry in 1972.

TABLE V

Market Disposition of Shipments
By Ontario Forest-Based Industry : 1972

Industry Group	Total Value of Shipments (\$Millions)	% Shipped to Domestic Markets	% Shipped to Export Markets
Logging	234.1	97.6%	2.4%
Sawmills	188.7	53.6%	46.4%
Pulp and Paper Mills	778.1	45.3%	54.7%
Total End-Product Shipments ¹	958.6	45.9%	54.1%

SOURCE : Ontario Ministry of Industry and Tourism,
Trade Research Branch.

1. Total end-product shipments exclude timber and pulp chips shipped for further processing in Canada.

Logging

On the average, more than 95% of the total value of shipments by Ontario was destined for direct consumption or further processing within Canada. Those logging shipments which were exported originated largely from patent lands. Provincial legislation prohibits, except by special approval, the export of unmanufactured Crown timber from Ontario.

Sawmills

An examination of the market disposition of sawmill shipments over the period 1966-1972 reveals the major dependence of sawmills on shipments of lumber, and the increasing dependence on export markets for this lumber.

Lumber³ accounted for an average of 56% of total shipment value by the sawmilling group over the period 1966-1972. The major part of this lumber is destined for use in North American residential construction. The value of lumber shipped to export markets increased approximately 10% per year over the seven-year period, accounting for 70% of total lumber shipment value in 1972. This heavy dependence on extra-provincial residential construction is the prime reason for the dramatic cyclical nature of Ontario's sawmilling production and profitability, as they react to fluctuations in North American housing starts.

Of the total value of shipments of sawmills, approximately 46% was destined for export markets in 1972. It should be noted that over the four-year period, 1969-1972, when the sawmilling industry was modernizing and expanding, the value of production exported increased an average of 17.5% per year. This indicates that the more modern, larger capacity sawmills are heavily oriented to export markets.

Pulp and Paper Mills

Over the seven-year period, 1966-1972, exports averaged 57% of the total value of pulp and basic paper and paperboard shipments by Ontario producers. In the last four years of the period,

3.

Total shipments by sawmills includes lumber, plywood, veneers and assorted mill work.

1969-1972, however, export shipments declined approximately 4.5% per year, indicating a lessening of dependence on export markets.

Approximately 70% of industry export value over the seven-year period was processed beyond the pulp stage. Leading processed exports were newsprint, other paper for printing, and fine paper. Major export markets were the United States, accounting for approximately 90% of total export value and the United Kingdom accounting for approximately 2% of total export value.

General

Details of the export markets for aggregate production by Ontario's forest-based industry were examined. Over the seven-year period, shipments to export markets averaged over 55% of total value shipped. An average of 93% of exports was destined for the United States. This dependence on export markets in general, and United States markets in particular, is of major concern for two reasons. Unlike industries oriented to domestic markets, the forest-based industry is not sensitive to domestic economic policies and Ontario's forest-based industry is highly susceptible to the economic circumstances in one market, the United States.

Common Issues

The foregoing has reviewed the three major industrial activities of Ontario's forest-based industry in terms of

industry structure, costs, productivity and markets. There are a number of additional issues of interest common to all three industrial activities. Among these are: further processing, energy, the availability of manpower, and the future availability of wood.

Further Processing

More than 90% of Ontario forest-based industry production is processed to the manufactured product stage in Ontario. This includes pulp production which has traditionally been considered a manufactured good. If pulp exports are not considered a processed commodity, the percentage of goods taken to the manufactured stage is approximately 85%.

The extent to which pulp exports may be further processed within Ontario is beyond the scope of this Report. However, the potential benefits of such processing merits further examination. Pulp production is the most energy and pollution intensive of forest-based industry activities. It is therefore a high cost activity which offers less return to the province than basic paper and paperboard production. An examination of the potential for further processing of pulp would be timely, given that the expansion plans of Ontario's pulp and paper industry are highly oriented toward pulp, rather than paper, production.

Energy

The forest-based industries of Ontario are among this province's major consumers of energy and fuels at both the primary and secondary manufacturing stage. The pulp and paper industry is the most energy-intensive of the province's secondary manufacturing industries. Logging and the transport of logs is a heavily mechanized process. With respect to energy, the forest-based industries have two major concerns:

- i) Absolute Availability: A large number of modern pulp and paper units, plywood and veneer mills are fueled by natural gas. Industry estimates place future increases in gas demand at approximately 10% per year in the coming five-year period. There is a serious question as to whether additional natural gas will be available. While some units may convert to other fuels, the added costs could have a serious impact on the industry's viability. A moderating influence on any cost impact may be the ability of some units to return to wood-burning thermal generation of electricity.
- ii) Operating Costs: Pre-energy-crisis data, for 1972, places energy costs for the forest-based industries of Ontario at between 3% and 10% of total operating costs. A substantial increase in the costs of fuel and energy in the near future could find this sector in a serious cost-price squeeze.

Manpower

Remote worksites, the seasonal nature of cutting operations, and the arduous nature of the work make permanent employment in this industry increasingly less attractive, even though average hourly rates are approximately 5% higher than those for provincial manufacturing as a whole. The Ontario Forest Industries Association projected a possible shortage of up to 1,000 woods workers in the 1974-75 season and increasing shortages in the future. This manpower situation has two major consequences:

- i) Direct Costs: In times of buoyant markets, the wage demands of wood-workers are likely to be high. Potential expansions in production may be curtailed due either to increased labour costs, or to the absolute lack of manpower.
- ii) Capital Intensification: New operations, or those amenable to conversion, may opt for a more capital-intensive plant. While this could have secondary benefits in terms of more efficient wood utilization, alternative cost problems may arise due to the energy situation and the cost and supply of capital.

Wood Availability

The Government of Ontario is responsible for the maintenance of Crown forest productivity. This responsibility includes forest protection, silviculture and reforestation. The estimated maximum productivity of Ontario's forests, if intensively managed using existing techniques, is an annual yield of 20 million cunits of wood. Current Government activity in this field is adequate for the maintenance of an annual yield of only 5.5 million cunits. While this is barely adequate for current levels, an annual harvest of between 8 and 9 million cunits of wood is anticipated by 1980. Given a continuance of the current level of regeneration there is a distinct potential for timber shortages in the 1980's.

Any extended period of heavy cutting without sufficient regeneration would have a serious impact on the long-term yield of merchantable timber land. If such circumstances are to be avoided, an intensification of forest management activity will be required in the near future.

Potential for Development

The foregoing has described certain constraints and problems respecting forest-based industry development and operation. It should be noted, however, that the long-term potential for industry development appears good. European producers, Sweden and Finland, are pulling out of the

United States market. Recovery in the United States should witness a return to pre-recession growth rates in the demand for paper and paper products. Similarly, a recovery in North American residential construction should lead to a resurgence in sawmilling activity.

Provincial Significance

The forest-based industries have been a major force in the development of both the provincial economy and its regional components. The following examines the current status of this industrial group in the provincial economy in terms of employment and wages, investment, production, and exports.

Employment and Wages

Over the period 1966 - 1972, the forest-based industry accounted for an average of 1.4% of the employment in the province. Reductions in the forest-based labour force and increases in total provincial employment caused an average decline of 6% annually from a high of 1.6% of total employment in 1966 to a low of 1.1% in 1972.

Wages paid by the forest-based industry averaged 1.6% of total wages paid in the province over the seven-year period. A declining trend similar to that in employment was also evident.

Investment

The relative share of total capital and repair expenditures by manufacturing in Ontario, which was accounted

for by forest-based manufacturers, was examined by the Task Force. Provincial capital and repair expenditures for logging are not available.

Forest-based manufacturers in Ontario accounted for an average of :

- . 1.9% of annual capital expenditures by manufacturers;
- . 3.6% of annual repair expenditures by manufacturers; and
- . 2.3% of total annual investment expenditure.

No trends in forest-based manufacturers' share of either capital or repair expenditures were discernible.

Production

Over the period 1966 - 1972, the forest-based industry accounted for an average of 3.8% of value-added in manufacturing by Ontario industry and 3.5% of the value of shipments by all manufacturers in Ontario. Both of these figures showed a declining trend. The portion of value added accounted for by the forest-based industry declined 3% per year from 1966 - 1972, while the portion of value of shipments declined 1.5% per year.

Exports

Over the period 1966-1972 the forest-based industry accounted for an average of :

- . 0.7% of total Ontario exports of agricultural and crude products;
- . 9.1% of total Ontario exports of fabricated and end-products; and
- . 7.7% of total Ontario exports of all types.

In all cases these percentages exhibited a declining trend with the portion of total Ontario exports accounted for by the forest-based industry declining some 10% over the seven-year period.

Regional Contribution

In the foregoing we examined the relative importance of the forest-based industries to the provincial economy as a whole. This status is greatly accentuated when the industry's operations are considered on a regional basis.

To examine the regional importance of forest-based economic activity, the province was broken down into three component areas, the northwest, northeast, and south. The northwest and northeast areas coincide with the Province's planning regions, while the south includes the southwest, central and eastern planning regions. Special tabulations were prepared for 1972.

Table VI gives the regional distribution of total forest-based industry activity in the province. The heavily forested north is host to most of the logging, whereas the south has some of the manufacturing activities because of substantial shipments of raw and semi-manufactured materials from the north.

The importance of forest-based activity to particular regions is displayed in Table VII. In terms of employment and value of goods shipped, southern Ontario exhibits a negligible reliance on forest-based activity. On the other hand, the northwest region shows a particularly heavy reliance on forest-based activity. Logging, sawmilling, and pulp and paper production directly accounted for more than 60% of employment and more than 65% of the value of goods shipped by the goods-producing industry in the region. The prominence of forest-based activity in the northeast is moderated by the heavy concentration of mining and mineral processing in the region. It should be noted, however, that aside from the mineral-based and forest-based industry there are few major goods-producing economic activities in the northeast.

Future development, both of the regions in general and their industry, would not appear likely to alter either regional dependencies on, or the regional breakdown of, forest-based activity. On the basis of available wood supply the forest industry would appear primarily limited to northern

TABLE VI

Regional Distribution of Forest-Based
Industry Activity in Ontario; 1972

<u>Industrial Activity</u>	<u>Northwest</u>	<u>Northeast</u>	<u>South</u>
Logging:			
- Employment	48%	29%	23%
- Value of Goods Shipped	48%	25%	27%
Sawmills, Plywood and Veneer Mills:			
- Employment	11%	52%	37%
- Value of Goods Shipped	17%	48%	35%
Pulp and Paper Mills:			
- Employment	37%	23%	40%
- Value of Goods Shipped	<u>43%</u>	<u>23%</u>	<u>34%</u>
Total:			
- Employment	34%	31%	35%
- Value of Goods Shipped	40%	27%	33%

Source: Ontario Statistical Centre, Special Tabulation.
Statistics Canada Cat. No. 25-202.

TABLE VII

Percentage of Total Regional Employment
In Goods-Producing Industry
And Value of Goods Shipped
Accounted for by Forest-Based Industry; 1972-

<u>Group</u>	<u>Northwest</u>	<u>Northeast</u>	<u>South</u>
Logging:			
- Employment	18.8%	3.9%	0.05%
- Value of Goods Shipped	15.5%	2.8%	0.2%
Sawmills, Plywood and Veneer Mills:			
- Employment	4.4%	7.2%	0.09%
- Value of Goods Shipped	4.4%	4.3%	0.4%
Pulp and Paper Mills:			
- Employment	39.3%	8.4%	0.3%
- Value of Goods Shipped	<u>45.9%</u>	<u>8.6%</u>	<u>1.0%</u>
Total Forest-based Industry:			
- Employment	62.5%	19.5%	0.4%
- Value of Goods Shipped	65.8%	15.7%	1.6%
Source: Ontario Statistical Centre, Special Tabulation.			

Ontario for any expansion of production and, aside from mineral development, there would appear to be a limited scale of alternative sources of goods-producing employment to the forest-based industry.

Cyclicality

It is commonly believed that the forest-based industry, both the pulp and paper sector and the sawmilling sector, experience cyclical swings. This section investigates several measures to determine the extent of the cyclical performance pattern in this industry. The indicators used include net income to sales, selling price indices, employment indices and indices of mill capacity utilization for the wood and the paper and allied industries on a national basis (provincial data is not available) over a nine-year period, 1966-74.

As anticipated, the four indicators were consistent in identifying the cyclical performance of both the pulp and paper and wood sectors.

Pulp and Paper Sector

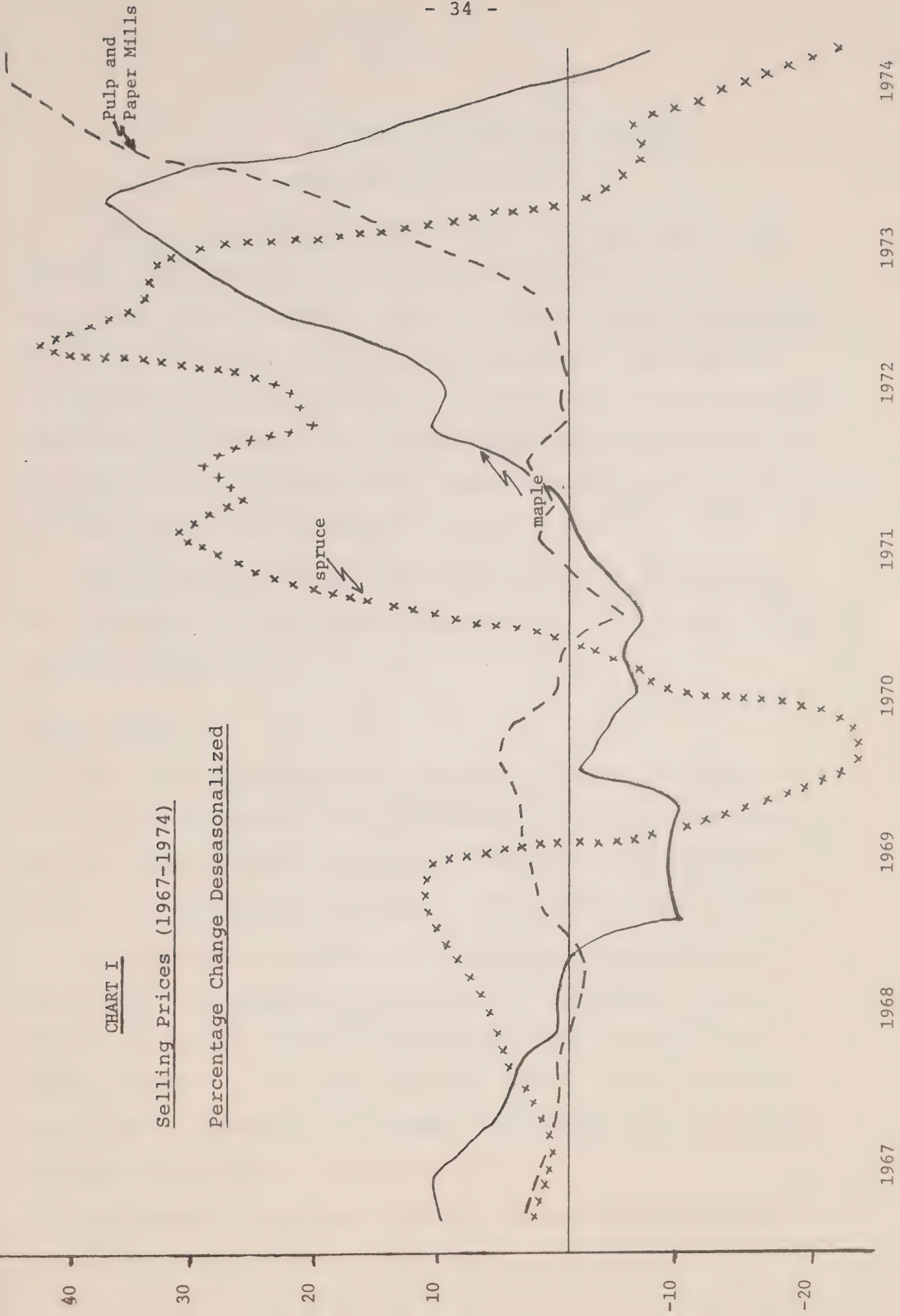
Chart I traces the deseasonalized³ price fluctuations over the eight-year period. The other three indicators were also examined (employment, capacity and profit) and the following cyclical pattern emerged:

3. The chart provides year to year price changes for corresponding quarters.

CHART I

Selling Prices (1967-1974)

Percentage Change Deseasonalized



- . 1970 and 1974 were peak periods.
- . 1971 was the low period.

Overall, the cycles in this sector were less severe and were of longer duration than in the woods sector. Price behaviour, as reflected in Chart I, is particularly interesting over the eight-year period. In the beginning of this period, prices remained unusually stagnant in the face of varying market conditions. Prices tend to respond quickly during upturns, but as experienced in recent months, companies have been very reluctant to reduce prices in the face of weakening markets.

Performance in the pulp and paper sector is dependent on the performance of the economy in general and the United States' economy in particular.

Wood Sector

As reflected by all four indicators, the wood sector exhibited much greater and more erratic fluctuations than the pulp and paper sector. High points occurred in 1968-69 and in 1973, with low periods occurring in 1967, 1970-71 and 1974-75.

As shown in the section on profitability, performance fluctuates dramatically in this sector, with profits varying from a net loss in 1970 to a substantial gain in 1973. In direct contrast to the pulp and paper sector, prices are much more flexible downward as witnessed during the recent slowdown when prices dropped by as much as 40%.

Performance in the wood sector is closely related to the number of housing starts in North America, particularly

in the United States.

Profitability

In examining the profitability of Ontario's forest-based industry it may be useful to begin by comparing the Crown stumpage charges in different provinces, since these Provincial charges directly affect profits.

1974 Crown Stumpage Charges (\$/cunit)			
Jurisdiction		Sawlogs	Pulplogs
Quebec ¹	Softwood	\$1.70	\$2.05
	Hardwood	2.20	1.50
Ontario	Softwood	5.70	5.70
	Hardwood	10.00+bonus	1.20
Alberta	Softwood	9.00	1.25
British Columbia	Softwood	18.00	18.00

Source: Crown Stumpage in Ontario: A Background Report, Ministry of Natural Resources (Sept. 74) (unpublished)

1. In 1975, rates were revised to approximately \$5.00 for softwoods, \$2.30 for poplar and \$4.38 for hardwoods.

It must be realized that such a table does not present a complete picture. Aside from the difficulties of construction and interpretation, the stumpage charges are subject to being quickly outdated. Also, stumpage cost is only one of many cost items assessed the industry. Furthermore, in different jurisdictions payment is being made for entirely different mixes of goods

and services. For example, both the costs paid and the services received vary immensely in terms of security of tenure, planning, harvesting, silviculture, transportation, taxation and numerous other aspects, from one province to another.

Because of the difficulty of analyzing and comparing such diverse environments through an aggregation process, it is generally assumed that a more meaningful approach is to analyze the final result of this complexity of factors by examining the final profitability and tax burden borne by the forest industry. This type of examination, both across jurisdictions and vis-a-vis other sectors within the Ontario jurisdiction, is the subject of this and the following section of the Report.

Estimates of the profitability of Ontario sawmills and pulp and paper mills appear in Table VIII. The figures in this table are derived from corporate income tax returns, using a representative sample of companies operating primarily in Ontario and selling mostly wood products.

TABLE VIII

Profitability of the Forest Industry
in Ontario
1970-1974

	1970	71	72	73	74	Average ¹
	<u>Net Income/Sales</u> <u>(%)</u>					
Sawmills	-1.8	0.8	4.7	11.2	10.7	5.1
Pulp & Paper & Integrated Companies	3.2	2.6	1.8	5.5	n.a.	3.3
	<u>Net Income/Shareholders</u> <u>Equity (%)</u>					
Sawmills	-5.3	3.3	21.8	43.6	25.8	17.8
Pulp & Paper & Integrated Companies	4.2	2.6	1.9	6.9	n.a.	3.9
	<u>Net Income/Total Assets</u> <u>(%)</u>					
Sawmills	-1.8	0.9	5.7	12.5	12.0	5.9
Pulp & Paper & Integrated Companies	2.8	1.7	1.3	4.4	n.a.	2.6

Source: Ontario corporation tax returns, selected companies
1. 1970-74 for sawmills, 1970-73 for pulp & paper

Even for this short data period, the table illustrates the distinctly cyclical nature of the forest-based industry and the sawmill sector in particular, with income as a percent of sales varying from -1.8% to 11.2% in the case of sawmills and from 1.8% to 5.5% for pulp and paper companies.

For Canadian industry as a whole, more extensive data is available through Statistics Canada, enabling an inter-industry comparison. Table IX provides this information for selected industry groupings. It clearly illustrates the large fluctuations in profitability in both the wood and paper industries. Between 1973 and 1974, for example, on the basis of both net income on shareholders equity and total assets, the wood industries switched from well above to well below the manufacturing and industrial average profitability ratios, while the paper and allied industries group did the exact opposite in the same years, a strong indication of the dynamic nature of the industries.

On the basis of three selected ratios, Table IX demonstrates that the wood industries were significantly less profitable than were the other industries or industry aggregates. The paper and allied industries also demonstrated a significantly lower profitability over the nine-year period, on the basis of both net income/equity and net income/assets. However, the ratio of net income/sales demonstrated a level of profit quite similar to that in the aggregate industry groupings of all manufacturers and all industrials.

A comparison of the profitability of Ontario companies with Canadian companies provides some interesting conclusions. Table X indicates that, for the wood industries, companies are more profitable in Ontario than in Canada as a whole.

Profitability of Selected Industry Groups
in Canada
1966-1974

TABLE IX

	1966	67	68	69	70	71	72	73	74	Average 1966-74
	Net Income/Sales (%)									
Wood Industries ¹	2.4	1.2	3.4	3.1	-0.7	1.2	3.4	6.6	4.0	2.8
Paper & Allied	7.8	4.1	3.8	4.8	2.8	1.9	1.8	5.3	8.6	4.6
Metal Mines & Primary Metals	14.1	13.8	13.4	12.6	12.2	8.8	8.1	12.1	12.2	11.9
Total Manufacturing	4.6	3.8	4.0	4.1	3.1	3.7	4.2	5.0	5.3	4.2
Total Industrials	4.6	4.2	4.3	4.1	3.7	4.0	4.3	5.0	5.0	4.4
	Net Income/Shareholders Equity (%)									
Wood Industries ¹	7.4	3.8	10.8	9.0	-2.0	4.1	11.1	23.0	12.6	8.9
Paper & Allied	11.3	6.1	5.7	7.6	4.3	3.0	3.1	10.5	19.3	7.9
Metal Mines & Primary Metals	13.2	12.9	13.2	12.1	13.0	8.7	8.1	15.1	17.2	12.6
Total Manufacturing	10.7	9.0	9.7	10.0	7.3	9.3	11.0	14.1	16.0	10.6
Total Industrials	11.1	10.1	10.2	9.8	8.3	9.2	10.5	13.4	14.7	10.8
	Net Income/Total Assets (%)									
Wood Industries ¹	2.8	1.5	4.4	3.6	-0.8	1.5	4.3	9.3	5.0	3.5
Paper & Allied	6.1	3.0	2.9	3.8	2.0	1.4	1.4	4.8	8.7	3.8
Metal Mines & Primary Metals	7.9	7.3	7.5	7.0	7.2	4.6	4.2	7.6	8.4	6.9
Total Manufacturing	5.6	4.6	5.0	5.0	3.7	4.7	5.6	7.2	7.8	5.5
Total Industrials	5.5	4.9	5.0	4.8	4.1	4.5	5.1	6.4	6.7	5.2

Source: Statistics Canada: Industrial Corporations Financial Statistics (61-003)

1. This group includes furniture and fixture industries which could not be separated from the group. However, profitability in these industries was found to be quite similar to the wood industries.

Profitability in the Wood Industries
Ontario and Canada, 1970-74

TABLE X

	Average 1970-74	
	Ontario ¹ %	Canada ² %
Net Income/Sales	5.1	2.9
Net Income/Shareholders Equity	17.8	9.8
Net Income/Total Assets	5.9	3.9

Source: Tables VIII and IX

1. Data refers to sawmills, plywood and veneer mills only.
2. Data refers to all wood industries, plus furniture and fixture industries.

In a Price Waterhouse study of the pulp and paper industry, a regional analysis of sample companies indicated that Ontario firms (actually companies with head offices in Ontario) were significantly more profitable than those in other provinces for the period 1967-1971, as indicated below:

Regional Profitability of
Statcan Questionnaire Companies
1967-71

TABLE XI

	1967	1968	1969	1970	1971	Average 1967-71
	Net profit/net sales (%)					
Ontario	6.7	5.3	6.5	4.3	1.7	4.9
Quebec	4.5	3.4	3.9	2.1	-0.6	2.6
Maritimes	1.1	0.1	4.9	7.1	-3.9	1.9
British Columbia	-0.1	-0.1	1.4	2.9	1.6	0.8

Source: A Study of Taxation Practices Related to the Pulp and Paper Industry, Price Waterhouse & Co. (August 1973)

The Price Waterhouse study also attempted to analyze the profitability of public companies in the United States, Sweden and Finland but was unable to obtain sufficient data for meaningful comparisons. The partial results that were obtained, however, led them to hypothesize that U.S. and Swedish pulp and paper companies may have been more profitable than Canadian and Finnish companies during that five-year period.

Tax Burden

The following table provides an estimate of the amount of direct revenue Ontario collected from the forest-based industry during 1974.

Ontario Revenue from the
Forest-Based Industry, 1974

TABLE XII

	Estimated 1974 (\$000,000)
Crown charges	29
Corporate income and capital taxes	14
Retail sales tax	4
Gasoline tax	<u>3</u>
Total	50

Source: Ontario Ministries of Treasury, Economics and Intergovernmental Affairs and Natural Resources.

In addition to this revenue, it should be noted that the employees of the forest industry also contribute to Provincial revenue through personal income and other forms of taxes and levies.⁴ Various other governments also collect property taxes and a variety of wage and salary levies (such as Workmen's Compensation and Canada Pension).

A more detailed breakdown of corporation taxes paid by the industry is presented in Tables XIII and XIV.

Ontario Corporation Taxes ¹ Paid by the Forest-Based Industry, 1969-73		TABLE XIII				
	1969	70	71	72	73	
	(\$000)					
Logging	83	75	71	60	189	
Sawmills, Plywood & Veneer Mills	660	378	599	1,283	2,924	
Pulp & Paper Mills	5,872	2,877	1,356	1,255	8,278	
Total	6,615	3,330	2,026	2,598	11,391	

Source: Ontario corporation tax returns.

1. Income and capital taxes

⁴ An estimate of the combined direct and indirect contribution to the Provincial revenue by the forest industry and its employees is available in The Ontario Forest Industry: Its Direct and Indirect Contribution to the Economy, Ont. Department of Lands and Forests, (April 1969).

Ontario and Federal Corporation Taxes¹
as a Per Cent of Total Shipments:

Ontario Forest-Based Industry, 1969-73

TABLE XIV

	1969	70	71	72	73	Average 1969-73
Logging	0.1	0.1	0.1	0.1	0.2	0.1
Sawmills, Plywood & Veneer Mills	1.5	0.9	1.0	2.3	4.0	1.9
Pulp & Paper Mills	3.4	1.5	0.6	0.4	2.9	1.8

Source: Statistics Canada Cat. Nos. 25-201, 35-204, 35-206, 26-204,
Ontario corporation tax returns and Ontario Treasury
estimates.

1. Income and capital taxes.

The above data is most useful when extended to compare the tax burdens of selected industry classes. Table XV compares the Canada-wide tax burdens for 1970-74 of the five groups previously identified. Over the period, there appears to be no significant difference in the tax burden between industries, although the forest industries again tend to show greater fluctuations. This would suggest that the tax system is being applied on a reasonably uniform basis among industries and does not work to the relative advantage or disadvantage of any of the identified sectors.

The Price Waterhouse study stated that Ontario pulp and paper companies had the highest corporate income tax burden of any province sampled for the period 1967-71. However, with the data sources and period examined in this review, a comparison of Ontario with Canada (Table XIV vs. Table XV) indicates no evidence of a significant difference in tax burden for either the paper or wood industries.

Federal/Provincial Corporate Tax Burden
on Selected Industry Groups in Canada,
1970-74

TABLE XV

	1970	71	72	73	74	Average 1970-74
	Corporation Taxes/Sales (%)					
Wood Industries	0.1	1.0	2.4	4.1	2.3	2.0
Paper & Allied	1.5	1.2	1.7	3.0	4.4	2.4
Metal Mines & Primary Metals	4.4	2.5	2.6	4.0	6.4	4.0
Total Manufacturing	2.0	2.2	2.3	2.5	2.8	2.4
Total Industrials	2.0	2.0	2.0	2.2	2.7	2.2
	Corporation Taxes/Total Assets (%)					
Wood Industries	0.2	1.2	3.0	5.8	2.9	2.6
Paper & Allied	1.1	0.9	1.3	2.8	4.4	2.1
Metal Mines & Primary Metals	2.6	1.3	1.4	2.5	4.4	2.4
Total Manufacturing	2.4	2.8	3.1	3.6	4.1	3.2
Total Industrials	2.2	2.2	2.4	2.9	3.6	2.7

Source: Statistics Canada; Industrial Corporations Financial
Statistics (61-003)

Summary

To review the foregoing:

- . Industrial activities based on Crown timber are highly concentrated and integration within the industry is a major force.
- . Labour is the primary factor-input cost in the industry.
- . Crown stumpage charges are currently a fixed charge per unit of wood. They account for a minor portion of total wood costs and only about 2% of total factor-input costs.
- . In 1972 the forest-based industry of Ontario (defined here as logging, sawmills, plywood and veneer mills, and pulp and paper mills) accounted for approximately 1% of total provincial employment, 3.5% of both value added and value of goods shipped by Ontario manufacturers and 5% of total provincial exports.
- . The forest-based industry is the primary activity in the economy of Ontario's northwest region, and an important activity in the economy of the northeast.
- . Labour cost and availability are leading to an increasing capital intensity in operations.
- . The industry is among the province's major consumers of energy.
- . The industry is highly dependent upon export, and exports are concentrated in one market, the United States.

- . The major constraints to industry expansion will be the availability and price of wood, energy, manpower, and the capital cost of facilities.
- . The industry is cyclical in terms of employment and production and is highly cyclical in terms of profitability. Comparing profitability with other provinces is a difficult and imperfect task; however, it is conclusive that profitability in Ontario is at least comparable to the Canadian average.
- . Tax burden studies to date have been consistently inconclusive in attempting to compare one sector across different jurisdictions because of the enormous number of factors involved.

Conclusions

The observations and analysis provided in the current chapter lead to a number of conclusions respecting any proposal to revise the system of Crown timber charges in Ontario.

In an ideal sense, any future system of Crown charges should:

- . respond to the volatile nature of the industry's market place, offering greater returns to the Province during periods of market buoyancy and relief to the industry during periods of market depression;
- . promote the most efficient utilization of Crown timber; and
- . leave unaltered any structural trends within the industry which promote efficient wood utilization.

The following points require explicit consideration in any such process of review:

- . The majority of tenure and stumpage charge are paid by a very small number of major companies.
- . Fluctuations and movements in the price of industry products originate from United States market circumstances, or will be effected through a highly concentrated industry structure. They will not be determined by domestic economic policy and circumstances.
- . Long-term industry growth will require dramatically increased expenditures on reforestation, silviculture and access roads. Under current circumstances the majority of this increased cost will be borne by the Province.

II THE COST OF FORESTRY TO ONTARIO

In attempting to determine an appropriate level of charges for Crown timber, the approach taken by the Task Force was to consider the following questions: 1) What does it cost the Province to provide the resource? and, 2) What will the market bear?

The preceding chapter, "The Nature of Ontario's Forest Industry" presented an indication of the industry's ability to pay in terms of its profitability, and pointed out some of the contributions by this industry to the province. This chapter addresses the initial question, "What does it cost the Province to provide this resource?".

Approaches to Determining Cost

There are several possible approaches to defining the costs of forestry, each resulting in a different level of cost.

1. First, the actual or historic expenditure which has been incurred in establishing and bringing a tree to maturity may be considered as the cost. Such a cost would include not only the relevant operating costs of the Ministry of Natural Resources but as well the capital costs of the land which had been used in timber production and the interest on carrying costs incurred over the rotation period.

2. A second approach would be to consider the replacement cost of any timber harvested. This replacement cost would be the present value of all future costs of establishing and growing a new forest crop to maturity.
3. The third approach would consist of determining the current annual costs which are incurred essentially because of the existence of the forest industry.

(See Figure I)

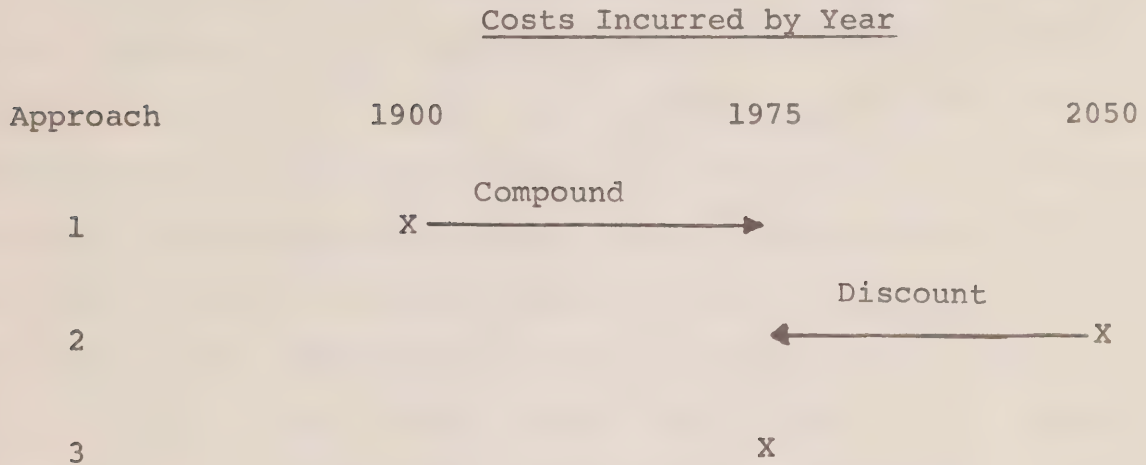
Government Expenditures on the Forest Resource

While the past cost and replacement cost approaches are clearly more acceptable in an economic sense there is one major drawback to these two approaches. There is a serious lack of detailed or reliable cost data for either approach.

The third approach to the cost of forestry, basically that of determining current timber expenditures, has great appeal to the Task Force. This approach is easily understood and the required cost data is readily available. The biggest problem to overcome in each of these approaches is determining what portion of each of the various Government expenditures on the forest resource is attributable to the forest industry as opposed to other users. The second problem is to decide if additional costs should be included since current expenditures are insufficient to pay for the regeneration of all the forest land harvested. By not incurring these costs at the present

FIGURE I. THREE APPROACHES TO DETERMINING COSTS

(X represents Government expenditure included as "costs" of the timber resource in each of the three approaches).



Note: This figure illustrates the three approaches which can be used to calculate the "cost" of the Crown timber cut in any year; here, 1975.

1. All past costs for establishment, protection and management of the timber resource cut in 1975 are compounded forward to their 1975 present value.
2. All costs of replacing the timber cut in 1975 are estimated and discounted to their 1975 present value.
3. The Government's actual 1975 expenditures (or perhaps an average of several previous years) are used.

they can only be deferred; they cannot be avoided if the industry is to remain viable. As such, there is impetus to include these at their full rather than partial level.

Table XVI and XVII present Government expenditures for forest management and forest protection for the years 1966-1967 to 1974 - 1975 ¹. Not all of these expenditures are made solely for the forest industry or because of its existence. As well as protecting the timber crop, fire protection, for instance is carried out to protect human lives, private property, watersheds, and recreational areas. Forest access roads are built for many users of the forest and not just for the forest industry. Land inventories and surveys are essential to the forest industry but find additional use in such applications as mapping, mineral exploration, and generally all types of land management activities and planning.

A survey was conducted among senior Ministry of Natural Resources personnel knowledgeable in the area of the various types of expenditures on the forest resource and an examination

1. These expenditures are for regeneration of only a part of the area cut. For instance, in 1970-71, 136,000 acres were artificially regenerated, approximately 130,000 acres, regenerated naturally, and 130,000 acres were not treated at all. The area treated was only 51% of the clearcut acreage requiring treatment. By 1973-74, 142,000 of the 271,000 acres of cutover land requiring treatment was artificially regenerated; i.e. 52% of the acreage requiring treatment was artificially treated.

of these costs was carried out to assist the Task Force in assessing what proportion of these costs could be attributable to the industry (see Table XVIII). Those expenditures directly related to the production and allocation of the timber resource have been assigned to the forest industry at a level of 100%. It must be emphasized that even though the costs of production are being attributed fully to the industry, since only about 50% of the cutover land requiring treatment is being regenerated, these costs represent only about 50% of the required level. As the Province moves to full treatment, these costs are expected to increase proportionately. Those expenditures on the forest resource which are of benefit to multiple users of the resource are conservatively assigned to the forest industry at a level of 25%.

Clearly, the assignment of costs to the forest industry is an exercise involving many value judgments, and the assignments in Table XVIII (or any other proposed assignments) cannot be defended to the percentage point. However, the assignment made by the Task Force was made as objectively as possible through the benefit of discussions with both Ministry of Natural Resources personnel and representatives of the Ontario forest industry.

In considering the cost of forestry, it should be pointed out that the Ministry of Natural Resources has definite plans for a growth in direct forest production expenditures in the coming years.

In 1972 the Government approved in principle a policy proposal to allocate funds, staff, equipment, and nursery expansions to annually regenerate sufficient cut-over areas in need of artificial regeneration to sustain an annual cut of 9.1 million cunits by 1982. Currently, in the third year of this expansion program , \$3.4 million of new money was added. If the forest production schedule is followed, by 1981-82 (the tentatively scheduled review date for new stumpage policy) an additional \$20 million, approximately, (in 1975-76 dollars) will be required.

Forest Management Expenditures in Ontario
1966/67 to 1974/75

TABLE XVI

Timber Branch	1966/67	1967/68	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75
	(\$'000,000)								
Basic Organization } Research (Pro-rated) } Main Office } Forest Ranger School } Junior Ranger School } Field Administration/Program Administration } Recreation Program Administration } Non-renewable Program Administration } Construction of Forest Access Roads } Maintenance of Forest Access Roads } Construction of Logging Roadse } Access to Resources } Forest Protection Branch Servicesj } Canada Land Inventory } Surveys (Pro-rated) } and Acquisition and Development } Less Federal Contributions/Reimbursements } of Expenditures } Total Forest Management Expenditures	1.067 9.480 0.614 0.620 0.140 0.275 1.008 - - 0.876f) - 0.347f) - - - 0.025 0.251 (1.126) \$13.577	1.196 10.838a) 0.865 0.768 0.146 0.339 1.114 - - 1.073h) - 0.271 - - - 0.013 0.367 (0.430) \$16.560	1.476 12.520a) 0.868 0.951 0.156 0.368 1.266 - - 0.660h) - 0.308 - - - 0.016 2.165 (0.362) \$20.392	13.632b) 0.723 1.820 1.568 0.041 - 0.807 0.453 0.251 - 1.069 0.222 - 0.617 (0.690) \$20.514	14.734b) 0.734 1.881 1.759 0.020 - 0.996g) 0.793 0.362g) - 1.074 0.197 0.052 0.257 (0.618) \$22.241	19.423b) 0.786 2.357 2.096 0.005 - 0.763 0.938 0.246 - 1.163 - 0.059 0.071 - \$27.907	19.633b) 1.039 3.564 0.687 - 0.030 0.797 0.889 0.274 1.388 1.100 - 0.364 - - \$29.765	21.006b) - 4.527 0.681 - - 1.191 0.980 0.323 1.780 1.301 - 0.251 - - \$32.040	24.60b) - 4.70 0.95 - - 1.30 1.25 0.65 1.10 - 0.05 - - \$34.65

Sources: Annual Reports of Department of Lands and Forests/Ministry of Natural Resources

- a) Field Administration expenditures are shown separately. b) Program Administration expenditures are shown separately. c) Prorated amounts are stated as in the annual reports. d) Research expenditures included in Forest Resource Production. e) Logging road construction costs are recovered over a five-year period through increased stumpage. f) Federal contributions (Forest access roads = \$0.370 million; logging roads = \$0.105 million) added to make expenditures comparable with other years. g) Logging road expenditures not reported separately from forest access road expenditures; likely part of timber branch or basic organization. h) Not shown separately. i) Consists of Main Office, Legal Services, Financial and Administration Services, Information Services, Personnel, and Junior Rangers (Also Youth Corps and Field Operational Services in 1971/72, 1972/73 and 1973/74). j) Portion of Forest Protection expenditures assigned to Forest Management; consists of Protection Services, Communication Services, Plant Maintenance, Stock Control and Repair, Air Service, and Maintenance and Construction of Locks, Bridges, Dams and Docks. k) Includes Forest Service, Stock Production, Crown Regeneration and Site Preparation, Crown Data Collection and Wood Measurement, Crown Management and Grants to Municipalities and Conservation Authorities.

TABLE XVII

Forest Protection Expenditures in Ontario
1966/67 to 1974/75

	1966/67	1967/68	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75 (Prelim.)
				(\$000,000)					
Forest Protection Branch	0.232	0.274	0.295	6.147	7.770	8.385	8.012	2.981	
{ Protection Services									
{ Fire Control, Services and Detection									
{ Air Services -									
{ Operating & Repair									
{ Communications -									
{ Operating & Repair									
{ Plant - Operating & Repair									
Basic Organization	7.915	8.372	9.520	0.784 0.078	0.731 0.093	1.077 0.093	1.357 0.101	1.271 0.122	
Extra Fire Fighting Research	0.833 0.077	1.796 0.054	0.491 0.106	0.143 0.614 0.008	0.215 1.475 0.025	0.235 2.525 0.066	0.181 3.000 0.068	0.213 1.149 ^{c)}	
Main Office, etc. ^{d)} /Ministry Administration (Pro-rated)	0.710	0.671	0.762	0.851	0.968	1.105	1.743	2.205	
Field Administration/Program Administration (Pro-rated)	0.693	0.661	0.755	0.726	1.013	1.144	0.320	0.312	
Resource Products Program Administration (Pro-rated)	-	-	-	-	-	-	0.001	0.004	
Stock Control and Repair	-	-	-	0.115	0.161	0.176	0.134	0.159	
Engineering Services	-	-	-	-	-	-	0.554	0.254	
Construction and Maintenance of Dams, Docks and Locks	-	-	-	-	0.165	-	-	0.108	
Access to Resources	-	-	-	-	-	-	-	0.106	
Construction of Forest Access Roads	-	-	0.307	0.050	0.070	0.011	0.016	0.045	
Maintenance of Access Roads	-	-	0.101	0.282	0.191	0.170	0.136	0.139	
Land Acquisition and Development	-	-	-	-	-	-	-	-	
Geological Service and Shared Exploration Costs & Land Surveys	0.005	0.012	-	-	-	-	-	-	
Less Federal Contributions	(0.535)	-	-	-	0.017	0.020	0.164	0.139	
Total Forest Protection Expenditures	\$9,930	\$11,841	\$12,337	\$9,796	\$12,895	\$15,006	\$15,786	\$14,233	\$19.15

Sources: Annual Reports of Department of Lands and Forests/Ministry of Natural Resources

a) Pro-rated amounts are stated as in the annual report. b) Likely part of Protection Services expenditures.

c) Likely included in Protection Services or Fire Control, Services and Detection. d) Includes Forest Technical School and Junior Ranger Program. e) Includes Main Office, Field Offices, Financial Management, Administrative Services, Information Services, Legal Services, Personnel, Junior Rangers and Youth Corps. f) Likely part of Forest Protection Branch.

Forest Protection and Management Charges Assigned to the
Ontario Forest Industry: 1966/67 to 1974/75

TABLE XVIII

Expenditure by Government ¹	Assumed Industry Share	(\$000,000)									
		1966/67	1967/68	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75 (Prelim.)	
Forest Resource Production	100%	11.161 11.161	12.899 12.899	14.864 14.864	14.355 14.355	15.468 15.468	20.209 20.209	20.672 20.672	21.006 21.006	24.60 24.60	
Forest Access Roads	25%	0.876 0.219	1.073 0.268	0.660 0.165	1.260 0.315	1.789 0.447	1.701 0.425	1.686 0.421	2.171 0.542	2.55 0.64	
Ministry Administration	100%	1.035 1.035	1.253 1.253	1.475 1.475	1.820 1.820	1.881 1.881	2.357 2.357	3.564 3.564	4.527 4.527	4.70 4.70	
Field Administration	100%	1.008 1.008	1.114 1.114	1.266 1.266	1.568 1.568	1.759 1.759	2.096 2.096	0.687 0.687	0.681 0.681	0.95 0.95	
Misc. Indirect Management	25%	0.025 0.006	0.013 0.003	0.016 0.004	1.291 0.322	1.323 0.331	1.222 0.305	2.488 0.622	3.081 0.770	1.10 0.28	
Land Acquisition & Development	100%	0.251 0.251	0.367 0.367	2.165 2.165	0.617 0.617	0.257 0.257	0.071 0.071	0.364 0.364	0.251 0.251	0.05 0.05	
Forest Protection	25%	9.930 2.482	11.841 2.960	12.337 3.084	9.796 2.449	12.895 3.224	15.006 3.751	15.786 3.946	14.233 3.558	19.15 4.79	
Total of Costs Assigned to Forest Industry	-	16.163	18.864	23.023	21.446	23.367	29.214	30.276	31.335	36.20	
Average of Previous Three Years of Costs	--	-	-	-	19.350	21.111	22.612	24.676	27.619	30.275	

1. See Tables XVI and XVII

III REVIEW OF TIMBER REVENUE SYSTEMS

Although 90% of the productive forest land in Ontario is held by the Crown, numerous private woodlots in southern Ontario and corporately held woodlands in the north, provide up to one-third of the total annual timber harvest. This private wood is either self-consumed by the producer or sold through a competitive market system. However, most Crown wood, particularly in northern Ontario, has traditionally been disposed of at negotiated rates under market circumstances that can be best described as those of a bi-lateral monopoly, i.e. one buyer and one seller. Due to the lack of a competitive market for many kinds of wood, most negotiated Crown rates are independent of private sale prices except to the extent that they tend to have a dampening effect on private sale prices.

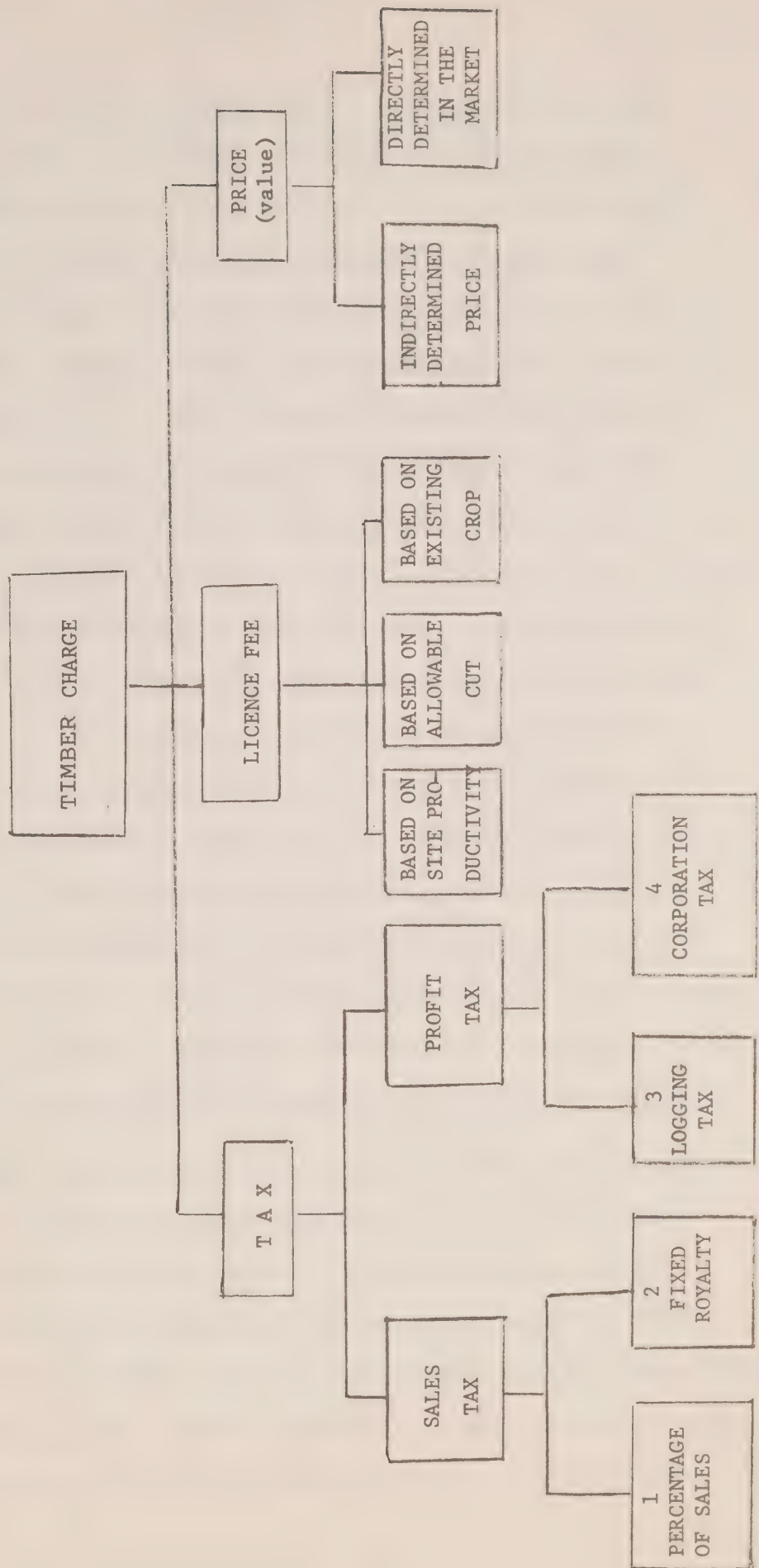
Three basic approaches to setting Crown timber rates are outlined in Figure II. Under each approach is listed a sample of alternative systems which fall within that general approach. The diagram is meant to serve only as a guide in the classification of alternative systems and actual methods of setting charges for timber are not necessarily uniquely defined by any of these particular approaches. They can, and often are, used in combination both in Ontario and other jurisdictions.

Tax, Licence Fee and Price

Revenue from the timber resource may be realized from

FIGURE II

A CLASSIFICATION OF APPROACHES TO ASSESSING TIMBER CHARGES



a "tax", from the fee charged for a licence to use the resource or from the "price" charged for the resource supplied to its users. In Ontario the forest revenues collected as "tenure charges" (forest protection and management charges) and the fees for hunting and fishing licences fall largely in the category labelled "licence fee" in Figure II . The "stumpage charge" collected in Ontario is the price or value of the standing wood sold to a user. The mining tax and the now-abandoned logging tax fall in the category labelled "tax". The essential difference between the price approach and the other two approaches is that in the latter cases the additional raw material cost to the user of utilizing an extra unit of the commodity is zero. The user pays either for the right to use the resource or for having made a profit from processing and selling it. These approaches of tax, price and fee need not be mutually exclusive, as it is entirely possible to set a fee for the right to cut timber, then charge a price for the amount of timber harvested and finally to impose a tax on the profits made from processing or selling the timber.

The main theoretical implication of the price approach is that if the price is sufficiently high it can reduce the quantity of resource used. Alternatively, use of a larger volume of the resource can be encouraged by lower prices. The licensing and tax approaches on the other hand encourage use of the largest quantity of resource that will generate maximum profits for the operator. They provide

no impetus to conserve the raw material input.

An annual licence fee to hold a timber tract, if charged on a per unit area basis, will discourage licensees from holding timber in excess of their requirements. If sufficiently high, such a fee can keep the land holdings of operators at their minimum requirements. No fee, or a low fee, will encourage licensees to keep large areas so that they may safeguard possible future expansion, and prevent the establishment of competitors. This can lead to poor utilization of the forest. At the other extreme, too high a fee can be a deterrent to forest industry development.

From a Provincial point of view there is substantial reason to realize revenue from timber in the form of a price, in that it is the only approach which permits regulation of the level of timber harvesting and in itself fosters improved utilization.

The Tax Alternatives

The tax alternatives can be broadly subdivided into "sales" taxes and "profit" taxes. Sales taxes involve levies on the output of the taxed firm. The tax can be on the value of sales (#1 in Figure II) or on the volume of sales (#2 in Figure II). The federal sales tax is a good example of the first; the Ontario royalty on fur-bearing pelts is an example of the second. The corporation income

tax (#4 in Figure II) is a well-known type of profit tax. A less well-known and special kind of profit tax is the logging tax (#3 in Figure II) which was applied to profits from logging operations in Ontario from 1950 to 1972.

The Licence Fee Alternatives

The licence fee per unit area of forest land held under licence can be based on any of a number of criteria.

If the fee is determined by the productivity of the site, the charge for fertile areas with higher quality timber and more favourable logging conditions will be higher than the charge for less productive areas. In practice, the quantitative assessment of productivity is difficult and the allowable cut ¹ is often used as a measure of the actual productivity. Occasionally, the actual volume of the existing crop of trees may serve to represent the productivity of an area and this may form the fee basis.

The Price Alternatives

Prices can either be determined directly in the market or can be indirectly imputed. They are best established if a competitive market exists for the sale of the resource. An open auction or tender can, in such circumstances, determine the most appropriate price for the resource. Some of the timber prices in the United States and Sweden are determined by this method and serve as guides for other transactions

¹. The allowable cut is described as the amount of timber that can be cut from a given area in a given period under sustained yield management.

in those countries. In Ontario, timber price determination by this method would require that long-term commitments be cancelled or reduced and that a large number of timber lots be sold every year throughout the province.

In the absence of an open market, the price approach is still possible through reliance on indirect estimation of the value of the resource.

Other Revenue Systems

Ontario's forest products compete nationally and internationally with forest products from other provinces and from the United States and Scandinavian countries. Therefore, it is useful to examine those systems used by our competitors to determine wood costs.

In each of the Canadian provinces a substantial portion of the forested land is Crown land and one or two large forest industry companies tend to dominate a particular sub-region. Thus there is a lack of direct market competition for wood, in contrast to the situation in the United States and Scandinavia. As a result, Canadian timber charges are generally based on some form of indirect price determination.

The eastern provinces have in general gone about this determination in a relatively obscure and "ad hoc" manner, while the western provinces have selected more formal systems (normally a variation of the conversion return method) for determining their stumpage charges. These systems of timber pricing are broadly summarized in the following sections.

The Eastern Canadian Systems

Originally, each of the eastern provinces introduced a Crown stumpage levy as a vehicle for revenue generation. These charges edged upwards in value during the early 1900's, stalling, then declining, with the depression era.

Following the depression, the eastern provinces did not again substantially revise their stumpage charges upwards, thus demonstrating the apparent objective of using low stumpage charges as a means of attracting forest industry investment. As a group, the provinces adopted the philosophy that stumpage should be quite competitive with that in effect in neighbouring provinces and that direct revenue could be reasonably foregone in order to attract industry, thus achieving increased employment and an expanded tax base in the more remote forest regions of the province.

These provinces have set, or revised, stumpage prices without any formal mechanism although three implicit principles appear to be :

1. a tendency to not disrupt the "status quo" (historic continuity, industrial stability and adherence to commitments);
2. a desire to have stumpage charges which are not dissimilar to those in effect in neighbouring provinces; and,
3. preference for a fixed schedule with two basic price dimensions: hardwood-softwood and sawlog-pulplog.

In each of the provinces, the stumpage system has allowed for significant variation in individual stumpage charges. The large companies have substantial bargaining power in both a political and an economic sense. Furthermore, most were enticed to locate in the host province (or some particular sub-region) by means of individual negotiation and special concessions. It is clear that individual negotiation is a factor and that stumpage charges are not consistent from one firm to another. However, it is also clear that these varied charges are associated with varied commitments, such that the identification of any net inequity becomes highly clouded.

At the moment, each of the eastern provinces is reviewing its stumpage schedule. These reviews are taking the form of more than simple schedule adjustments, as the entire stumpage philosophy and system is being opened to examination. Results of these examinations are not yet fully available.

The Alberta System

The apparent objectives of the Alberta system are : to direct excess profit potential into provincial revenue funds; to permit sufficient profit to maintain a viable industry; and, to provide for equity amongst operators, while maintaining profit as a function of efficiency.

Alberta employs an appraisal system for sawlogs in different regions of the province and has developed a rather

unusual variation of the conversion return approach to setting stumpage. The stumpage assessment is 10% of selling price when mill net exceeds cost by \$16.00/M-fbm. For every \$2 variation (plus or minus) from \$16.00, the assessment alters 1/2% in that direction (5% minimum, no maximum). Costs are determined by a bi-annual, audited survey of 14 "efficient" mills. The selling price is taken as the three-month moving average of the United States Wholesale Price Index for lumber and the annual sawlog stumpage revenue is approximately \$12 million or \$9 per cunit of harvest.

Pulp companies are not subject to this system and operate on negotiated rates of about \$1.00 per cord.

The system leaves little opportunity for subjective treatment of the non-pulp industry and the use of industry average costs and prices clearly fosters efficiency in terms of spatial location, marketing, operating techniques and size of operation.

The British Columbia System

British Columbia has devised a Revised Rotheray System (a conversion return approach, whereby selling price and costs are determined; then, by subtracting an allowance for profit and risk, arbitrarily set at 20%, Crown stumpage is determined as the residual). Each sale is separately appraised and the task breaks down into three components:

1. Appraisal calculation, based on :
$$\text{Stumpage} = \frac{(\text{Selling price}) - \text{Costs}}{1 + \text{profit ratio}}$$
2. Stumpages are adjusted monthly, if the three-month moving average price changes by \$3.00/cunit for logs, or, by \$5.00/M fbm for lumber.
3. An annual survey (and audit) is conducted to determine operating and milling costs.

In 1973, revenues were in excess of \$250 million and in 1974 approximated \$300 million. The average stumpage revenue generated has been about \$18.00 per cunit. However, depressed lumber markets in the fall of 1974 resulted in the Government temporarily lowering stumpage rates.

The industry charges that the system will force it out of business, or, out of the province. Further, they claim that the system is far too complex and costly to operate, both to the Government and the industry. The British Columbia Forest Service, however, maintains that the industry does not object to the philosophy of the appraisal system. The single most contentious component in the appraisal system is the allowance for profit and risk which was set at 20%, (12% + 8%, more or less). It is difficult to defend a 20% rate, or any other rate.

The United States Forest Service System

The United States Forest Service, charged with managing the

20% of the nation's forest land which is under federal control, offers parcels of timber for sale through a market bid system. A conversion calculation is made (current prices minus estimated costs and an allowance for profit and risk) and the residual amount is considered to be the appraised value of such timber. The parcel is advertised and bids are called for, without revealing the appraised value. If the highest bid falls short of the appraised value, then the timber is not disposed of.

Because sales on the United States West Coast often involve large tracts, and harvesting occurs over a prolonged period, various systems of indexing a stumpage price to a product selling price have been developed. One such system ties the stumpage bid to the lumber selling price at the time of contract. Timber scaled during subsequent calendar quarters is assessed stumpage at the contract price, adjusted by one-half of the difference between the lumber selling price in the contract quarter and that in the current quarter.

The Scandinavian Systems

In the Scandinavian countries, as in the United States, timber prices are determined much more by market competition than is the case in Canada.

In Sweden, 24% of the timber resource is owned by the Government, 25% by forest companies and 51% by others. In Finland about 27% of forests are publicly-owned. Only 6%

are owned by companies and the rest are under the control of farmers, co-operative societies and the like. In these countries, public timber is mostly disposed of by auction, while private timber is disposed of by a combination of auctions, tenders and closed negotiations.

The Ontario System

Historical Background

Timber has been a source of public revenue in Canada since at least the end of the 18th Century. In 1808 a tax was imposed on timber passing through the St. Lawrence River and in Ontario a stumpage charge in the form of Crown dues was imposed in the year 1820.

In Upper Canada, in the 1820's, licences to cut Crown timber were almost always issued by public auction. Bids were a lump sum amount on the area to be licensed. Crown dues were set from time to time by the Government and were paid, in addition to the bonus, on the basis of measurements of the volume harvested. At the beginning of this century the method of public auction was replaced by public tender with an upset price set by the Crown over and above the minimum dues level. With this change, Crown stumpage charges on timber sales had three elements - the statutory Crown dues, the upset bonus price and the bid price (if any).

The method of establishing stumpage prices by reasonably competitive sales of standing timber had changed completely by the 1920's. Because of the need for a long-term wood supply for the rapidly growing pulp and paper industry, small sales were unsatisfactory.

Partly because of the large tracts involved and partly due to the heavy investment costs of a mill, there was usually only a single buyer of timber in a prospective sale. The old situation of a market where a number of possible buyers could compete with each other and thus pay as high a price to the Crown as the market would bear had ceased to exist. The price was now determined by mutual agreement. The Government fixed a schedule of Crown dues and the bonus was mutually agreed upon on the basis of such factors as the quality of timber, its nearness to markets and the bargaining position of the two parties. As large sawmills replaced the older smaller establishments and pulping operations continued to expand, the price of wood on the stump was increasingly determined by bi-lateral negotiation.

Present Methods of Disposal

At present, the disposal of Crown timber is effected by the issuing of licences or by Volume Agreements. When a licence is issued the title to the timber land is retained by the Crown (in contrast with the practice of licensing mining land) and the operator is granted only

timber-cutting rights. These licences, which are specified by The Crown Timber Act, can be of four types :

1. Order-in-Council Licence (Sec. 3, sub sec. 1)
2. Sale Licence (Sec. 2, sub sec. 2)
3. Small Licence (Sec. 2, sub sec. 7)
4. Salvage Licence (Sec. 5, sub sec. 1)

Order-in-Council licences cover more than 99% of the total area presently under licence. The area of individual licences is usually large and, if properly managed, capable of supplying a sawmill or pulpmill on a sustained yield basis. The duration of tenure under these licences may be up to 21 years and can be further renewed. They are normally issued through negotiation to integrated logging and processing enterprises.

In the past, sale licences covered about 4% of the total area under all licences, but now constitute less than one half of 1%. These are small areas, of interest to independent logging contractors, usually meant to be cut during a period of two or three years and are mostly sold by invited tender.

The small licences commonly referred to as District Cutting Licences, apply to volumes of timber for which the stumpage charges are less than \$2,000 and a salvage licence may be issued when Crown timber has been killed or damaged by fire, insect, disease or wind.

Volume agreements provide timber from unlicensed Crown management units. They specify a type and an amount of raw material for varying periods of up to a maximum of 21 years. Such agreements reserve a supply of timber under Section 4 of The Crown Timber Act but do not grant the right to cut. Cutting is subsequently authorized by the issuance of an Order-in-Council licence. In the last five years, volume agreements have contributed an increasing proportion of the total Crown timber harvest.

Crown Levies

In addition to stumpage fees, the Government, as early as 1851, levied an annual rental charge for each square mile of forest under licence. This charge was for the purpose of defraying the costs of forest management.

In 1897, Ontario consolidated its several regulations concerning the sale of timber in The Crown Timber Act. The Act required those acquiring timber-cutting rights on Crown lands to pay to the Province a royalty based on the volume and value of the timber cut. The amount payable per cord or per thousand board feet was to be determined with reference to the kind of timber and its location. This basic royalty or "stumpage" continues to the present.

In 1917, the Act introduced an annual tax to cover the costs of fire protection and fire fighting services. Then, in 1925, it levied an annual ground rent on all productive timber lands under licence. Perhaps due to a feeling that

the stumpage and rental charges did not fully reflect the value of wood supplied by the Province, the logging tax was also introduced in 1950. It was a profit tax like the current mining tax.

Timber revenues in Ontario during the period 1925-1975 could be classified as:

- . a logging tax (1950-1972);
- . tenure charges per square mile of licensed area and consisting of a management charge (ground rent) and a forest protection charge; and
- . stumpage charges per unit of wood removed.

The stumpage charges in turn consisted of :

- . Crown dues, which were established by regulation for different species and represented the minimum stumpage. These were expressed according to several weight and volume measures used in the industry;
- . the bonus, if any, which was determined through negotiation in the case of an Order-in-Council licence and by Ministry of Natural Resources staff in the case of a sale licence; and,
- . the competitive sale licence bid, if any, over and above the dues plus bonus.

Logging Tax

Introduced in 1950, Ontario's logging tax was originally

levied at the rate of 9% of profits in excess of \$10,000 on woods operations. The tax base was broadened in 1957 and the rate was increased to 10% in 1963.

Most of the large Ontario companies which paid logging tax were integrated operations in which it was extremely difficult to determine or audit how much profit was attributable to logging per se. As a result, it was never possible to determine whether the logging tax plus the Crown charges equalled the fair Provincial share of economic rent.

After 1961, two-thirds of the logging tax was made deductible from the federal corporation income tax and one-third from the provincial corporation income tax. The Ontario Committee on Taxation (Smith Report) recommended in 1967 that the logging tax, a minor and complicated revenue generator, be abolished if the Federal Government would be willing to increase the Provincial share of income taxes imposed upon logging companies so that the Provincial net returns from the logging tax would be maintained. In 1972, the Ontario logging tax was abolished.

Tenure Charges

The tenure charges levied from 1953 to 1967 were \$1.00 for ground rent and \$12.80 for fire protection on each square mile of productive forest area under licence.

With regards to tenure charges, the Smith Report recommended that the ground rent and fire protection charges be abolished and replaced by tenure charges at fixed

rates per cubic foot of allowable cut. In the same year, the Forestry Study Unit of the then Department of Lands and Forests observed that ground rent rates were too low and should either be abandoned or given a more significant role in the total charges on licensed areas. As a guide, the Study Unit Report also felt that fire protection charges should be roughly one-half of the average departmental costs of forest protection. Accordingly, it recommended that the ground rent be abolished and the fire protection charge be raised to \$25.00 per square mile on the productive forest area under licence and that the rate be periodically adjusted to maintain it at approximately one-half of the departmental cost of forest protection.

The Smith Report recommendation was not accepted and, on the basis of the recommendation given by the Forestry Study Unit, the following changes were made effective April 1, 1968:

- . The ground rent was abolished and in its place a "management charge" of \$2.00 per square mile of productive forest land was instituted.
- . The fire protection charge was renamed "forest protection charge" and raised to \$25.60 per square mile of productive forest land.

The total annual tenure charge since then has remained at \$27.60 per square mile of licensed productive forest land.

Crown Stumpage Charges

In 1967, both the Smith Report and the Report of the Forestry Study Unit examined the level of stumpage charges which had

been in effect since 1951. The Smith Report recommended that the dues be revised so that they would be tied to the productive capacity of the forested land as indicated by the calculated allowable cut. Companies would thus be encouraged to harvest this exact volume of timber.

The Report of the Forestry Study Unit also recommended changes in the Crown stumpage charges, though its approach was quite different from that of the Smith Report. Among its recommendations, the report included a revised schedule of dues which was essentially the same as existed before except that the rates were converted in terms of "per cubic foot", so as to be in line with its main recommendation of adopting only one measure of wood. The Study Unit stated that estimation of the "correct" stumpage value was difficult and that it thought the existing rates to be reasonable for the year 1965. However, it recommended that the rates be revised from time to time on the basis of changes in the general wholesale price index or the average selling price index of the main forest products.

In 1974, the schedule was revised to recognize the observation of the Forestry Study Unit that, except in the case of some species and fuelwood, there was really no reason why stumpage rates should differ according to the end products of roundwood. This revision also took into account the fact that the Province was moving into the practice of weight scaling and so rates were given in terms of weight as well as volume. Only tolerant hardwoods were considered to have a sufficiently wide range of value between

high grade and low grade logs, to justify progressively higher stumpage charges by grade. Also, as an interim adjustment pending the report of this Task Force, the Provincial revenue from Crown dues was doubled to account for erosion in the value of the dollar since 1951, as reflected by the changes in the implicit price index.

The revised schedule recognized six kinds of roundwood for the purposes of charging stumpage:

1. Wood from all coniferous species;
2. Wood from poplar and white birch;
3. Wood from tolerant hardwood species
yielding Grade 1 logs;
4. Wood from tolerant hardwood species
yielding Grade 2 logs;
5. Wood from tolerant hardwood species
yielding Grade 3 logs; and,
6. Wood for use as fuel.

IV. EVALUATION OF ALTERNATIVE REVENUE-GENERATING SYSTEMS

This Report has already examined the structure and economic importance of Ontario's forest-based industries - the economic importance being assessed in terms of both the direct and "downstream benefits" from the industry to the people and economy of Ontario. The ability of the industry to pay has been considered. The costs of forestry incurred by the Ministry of Natural Resources have been shown. All these factors have been considered in determining an adequate and fair level of timber charges.

The preceding chapter has described possible alternative approaches to collecting revenue for the use of Crown timber. In this chapter, the analysis and the findings, which led to the recommended system presented in the next chapter, are described.

Guidelines for Selection

As was noted in the preceding chapter, there are many possible systems for collecting timber charges. In selecting from these alternatives, the Task Force was guided by an explicit set of criteria. To satisfy these criteria the new system should generate revenue in such a way that:

1. is responsive to the health of the industry, recognizing that both the lumber and the pulp and paper sectors have separate and distinct cycles, with that of the former being more volatile;
2. is continued to be treated as a deductible expense for purposes of federal income tax;

3. maintains the Provincial revenue base;
4. enables industry to remain competitive internationally and encourages the continued growth of the industry in Ontario;
5. is simple to administer, so that the cost of collecting and compliance are minimized for the Government and industry respectively; and
6. encourages high utilization and proper management of forest resources.

All of the above attributes are not simultaneously attainable. In many cases, the maximization of one characteristic is achieved at the expense of another. Therefore, the selection of the most desirable system necessarily involves trade-offs amongst these attributes so that an acceptable mix is obtained.

As was outlined in the preceding chapter, there are three main approaches to collecting revenue for the use of Crown timber - as a tax, as a licence fee or as a price. In turn, each main approach could be applied in alternative forms and a system could be set up to include any one or combination of alternatives. The approach of the Task Force was to first consider the theoretical arguments for and against each alternative in order to limit the number of alternatives for empirical testing.

The main theoretical strengths and weaknesses of each alternative were given previously and therefore will not be repeated here; however, factors which excluded some alternatives from further consideration and included others, will be given.

The Tax Approach

From this approach, a royalty as a percent of sales, a royalty per unit of product, and the corporate income tax were eliminated from further consideration. The main objection to a royalty as a percent of sales is that it would discourage further processing in the province by imposing a higher charge as more value is added to the product. Since the forest industry produces a large variety of products, the administration of such a charge would be unnecessarily complex. In addition, both royalty alternatives fail to adequately satisfy other criteria set out above, such as deductibility for federal tax purposes. These alternatives are more likely to be considered non-deductible by the federal tax authorities.

The alternative of increasing the Ontario corporate income tax rate for the forest industry was rejected because such action could be misinterpreted as discriminatory, since the Ontario corporate income tax has traditionally been applied uniformly to all industries. However, as was noted earlier, a charge based on reported profits would be very responsive to the industry's cyclical pattern. This feature is also available with a logging tax; therefore, a logging tax approach was retained for further empirical testing.

The Licence Fee Approach

Currently the Province does levy a licence fee through the forest protection and management charges. This form of charge

is believed to act as a deterrent to companies holding under licence land in excess of their actual or projected requirements. However, since a licence fee would not be responsive to the industry's health it was felt that a licence fee should be used only in conjunction with other revenue-generating mechanisms.

The Price Approach

Ideally, the direct market alternative would appear to satisfy all the criteria; however, in practice, the prevailing market forces would prevent the application of such a system throughout the province. In order to function properly, the direct market approach would require competition in both the supply and demand side, a condition usually found only in the southern areas of the province. In this region, the direct market alternative is currently being successfully used in the assignment of smaller cutting areas referred to as "district cutting licences".

An alternative to the direct approach is to determine prices indirectly. Under this alternative, prices may be determined in a number of ways, including the establishment of prices at the level of economic rent (conversion return); setting the prices consistent with other jurisdictions or past pricing practices (comparative market approach); or, setting the prices at a level that would recover costs (cost of forestry approach). This alternative satisfies a number of the criteria; therefore, the indirect price alternative was retained for further empirical testing.

In summary, the following alternatives were retained for empirical testing:

- (a) the logging tax,
- (b) the conversion return, and
- (c) a modified version of the existing system of stumpage.

In conjunction with these three alternatives, a licence fee (tenure charge) was also applied, and direct pricing, where applicable, was retained.

Empirical Testing

The final test of these alternatives was to simulate their performance over an industry cycle, 1969-1973. The nature of these alternatives necessitated two distinct data bases; actual company data of sample companies for the logging tax and conversion return, and actual aggregate data of cut for the stumpage alternative. In addition, in recognition of the fact that the industry is not homogenous but is made up of three distinct sectors, (logging, sawmilling and integrated pulp and paper mills) the three alternatives were tested separately on each sector where feasible.

The Logging Tax Alternative

The testing of the logging tax involved collecting taxation and financial data for sample companies from each of the three sectors for the five years 1969 to 1973.¹ From this data, the base of the logging tax was calculated as follows:

1. Taxable income (net of prior year's losses) plus total Crown charges and the equivalent of Crown charges on purchased wood, plus certain disallowed costs and expenses, minus a processing allowance based on the original cost of operating assets.
2. To avoid double charging for the same wood, the base derived by the above calculations was adjusted for each company and for each year by applying the factor

$$\frac{\text{Wood from own licence}}{\text{Total wood used}}$$

In testing the alternative systems, the Task Force set the various parameters and rates so as to collect a predetermined average level of revenue over the five-year period, although in any year the level calculated could be higher or lower if the cyclical business conditions were properly taken into account. In addition, for all three alternatives it was assumed that part (usually 10%) of the desired level of revenue would be recovered in the form of a tenure charge.

Applying an appropriate rate to the logging tax base, the charge payable by each sample company in the sector was calculated.

1. A more detailed explanation of the testing procedure is presented in the Appendix.

The total logging tax applicable for the sector was estimated by summing the logging tax calculated for each sample company in the sector and expanding to the full sector by using an appropriate factor. Summing the three sectors' total would give the estimated logging tax for the whole industry.

The Conversion Return Alternative

Using the same sample companies and sectoral breakdown, a conversion return approach was tested over the same five-year period. As with the logging tax alternative, a measure of profits before the deduction of Crown charges or its equivalent on privately acquired timber was established. The basic difference between the two alternatives is that the logging tax is calculated as a percentage of the assessed profit, leaving the remainder for the operator, whereas the conversion return assigns a return to the company and the remaining portion of the profit is collected as the Crown charge.

In modelling the conversion return alternative, several definitions of return to the company were tested. The return allowed was calculated on sales, original cost of operating assets, and owner's equity.

The Stumpage Alternative

The stumpage alternative was relatively easy to test since the aggregate data used was readily available from the Ministry of Natural Resources' statistics. To facilitate sectoral analysis the amount of timber cut of each of the six classes presently

being used was allocated between the sawmilling and pulp and paper sectors.

The basic structure of the stumpage system of setting Crown charges has had a long history in Ontario. In our simulated testing of this system, modifications were introduced to the basic structure in order to have it more closely conform with the desired criteria. It was assumed that the tenure charge should collect 10% of the specified revenues, the bonus and bid an additional 10% and Crown dues the remaining 80%.

The main weakness of the existing stumpage system is that it is not sufficiently responsive to the industry's health. Because the Crown dues are fixed, any fluctuation would result only from changes in the quantity of Crown wood cut, in response to demand for the industry's products. However, it is believed that this weakness can be overcome by indexing Crown dues by some measure that is correlated with the industry profit level.

In consultation with industry representatives several indices were investigated. Capacity utilization and mill employment were rejected because no consistent relationship was found between these variables and industry profitability. Using reported profits of companies was also rejected because of the difficulty in obtaining reliable and consistent figures, particularly on a more frequent than yearly basis. Consequently, the use of such an index would necessarily involve a lag of as much as two years. These factors render such an index impractical.

An index, or rather a set of indices, which is reliable, highly correlated with the industry's health and minimizes the lag in response is the industry's selling prices of its products. In addition, price indices by their very nature would tend to protect this Provincial source of revenue from the eroding effects of inflation. Consequently, testing of the stumpage system included several approaches to indexing Crown dues for each class of timber, using the price or composite price index of the product or products for which the particular class of timber is used.

Analysis of the Three Alternatives

The Logging Tax

Until 1972, Ontario did levy a logging tax. This tax, however, imposed no additional tax burden on the industry since it was creditable two-thirds against federal and one-third against Provincial corporate income tax. Over the period it was in force, the logging tax generated very modest levels of revenue, accounting for an average of about 15% of the total Crown charges.

The new logging tax as envisaged by the Task Force would be deductible for income tax purposes rather than creditable. To exploit the responsiveness offered by this alternative, the tax was structured so as to collect 90% of the desired revenue - 10% would be generated by a tenure charge. However, this heavy reliance on a tax on profit would make timber an almost "free" commodity thereby introducing a major distortion in the

allocation of timber resource among the alternative uses. Furthermore, it was found that an effective tax rate of 50% to 60% was required to collect the desired revenue through a logging tax. Such a high rate plus the fact that a logging tax is based on profits or income may move the Federal Government to make such Provincial levies non-deductible for federal income tax purposes. Such a situation would have the undesirable effect of increasing the burden of the charge substantially.

Since the logging tax was viewed by the Task Force as an alternative means of charging for the use of only Ontario Crown timber, in the model the logging tax was imposed only on an estimate of profits from wood cut from Ontario Crown lands. Such a distinction, in practice would greatly increase the costs of compliance by the industry and the costs of audit by the Government, since many firms operate outside Ontario, use significant quantities of private wood or buy Crown timber harvested by some other firm and engage in non-forest activities.

As expected, the tests showed that the logging tax was responsive to the health of the industry. Also, through the processing allowance, further processing could be encouraged. However, since it failed to adequately satisfy the other criteria, the Task Force does not favour the adoption of a logging tax.

The Conversion Return

As was stated earlier, the conversion return alternative is a means of collecting economic rent for the use of this

forest resource. Theoretically, it is thought to be an accurate method of assessing the real value of the timber used, and by its very nature - since the charge for the timber is assessed as the residual after "costs" and a return to the operator has been deducted from sales revenue - it is very responsive to the health of the industry. This latter point was verified in testing. Like the logging tax the conversion return alternative was found to be very responsive to the cyclical swings experienced by the industry. However, most of the problems associated with a logging tax were also present with the conversion return.

The conversion return should be applied only to activities directly related to timber cut from Ontario Crown lands. The isolation of such activities in practice would present the same administrative and audit difficulties and costs described in the analysis of the logging tax. Restricting the base on which the conversion return is applied, as the results of computer modelling indicate, would permit only a low rate of return on investment and sales (4% and 1%) to the operators in order for the Province to collect the desired level of revenue. The prospect of earning such low returns would certainly not encourage the growth of this industry. As a point of clarification, the net dollar profits to the industry would be the same under any system since the alternatives are all structured to extract the same total revenue for the Province.

A further complication of the conversion return is the

determination of costs. In the models, actual reported operating costs were inserted since these were incurred in an environment which rewarded the efficient operator. However, with a conversion return there is no incentive to minimize costs; therefore, the application of the conversion return system involves assigning industry average costs for operation, as is being done in British Columbia on a regional basis. Ontario has a wide range of operating conditions in its forests and a complex mix of forest types, forest products and processes. Such an environment would defy the application of a provincial average of industry costs. Therefore, a complicated stratification of common operating conditions within the province would be necessary and the costs assigned to each group would require continual adjustments.

Notwithstanding the conversion return's very responsive feature, the complexity and costs associated with the implementation of this system make the conversion return approach undesirable for Ontario.

The Stumpage System

A stumpage system is currently in existence in Ontario and in most other provinces. The testing of this system with several modifications introduced to overcome some of the previously mentioned shortcomings yielded encouraging results.

Increasing the importance of the negotiated bonus as a revenue-generating instrument will ensure more equitable charges for superior quality timber and geographic advantages. In the

tests, the indexing of Crown dues by the selling price of the products for which the timber is used, rendered the system more responsive to the cyclical swings of the major sectors of the industry, although the responsiveness was less than either the logging tax or conversion return approaches. Indexing was also found to protect the desired revenue against the eroding effects of inflation. This would lessen the need for major periodic revisions in the level of rates.

Of course the responsiveness of this approach to the cyclicity of the industry is directly proportional to the price changes in response to market conditions. In our study lumber prices were found to be much more variable than pulp and paper prices. Lumber prices fluctuated greatly with demand conditions - this was very evident in the slump of late 1974 when lumber prices dropped by as much as 40%. Pulp and paper prices have little downward mobility; with a strong market prices increase but in a weak market prices tend to stagnate. Considering this situation, the argument has been raised by the private sector that indexing with prices will not help the pulp and paper sector in the declining phase of their cycle. The Task Force believes that in real terms the system is indeed responsive:

1. To the extent that pulp and paper production is reduced in the down phase they will pay less, since less timber is required.
2. If they are further hurt by having to accept lower prices or at least not being able to pass on their increased costs the indexing mechanism will adjust the rates accordingly. Pulp and paper mills derive benefit from indexing even if their

price remains constant because this would keep the price they pay for timber fixed which would mean that any increase in cost to provide the resource is absorbed by the Government. This implies a decrease in the price of their raw material in real terms. As was illustrated in Chapter I Table Vlll the sawmilling sector, because its prices drop, is more adversely affected in the bust phase of their cycle and consequently, requires more assistance at that time.

The stumpage system also seems to satisfy the other criteria. Once introduced, it would require minimal additional administrative costs since the billing mechanism would be changed only slightly. Since the system has a long history in Ontario and the level of revenue collected is related to the costs of forestry incurred by the Ministry of Natural Resources it is most likely to continue to be treated as a deductible expense for the calculation of federal corporate income tax. The combination of bonus, bid, tenure and pricing of the resource actually used is more likely to encourage optimal resource utilization. These features convinced the Task Force that an indexed stumpage system would best satisfy the criteria specified at the beginning of this chapter.

V. RECOMMENDATIONS

The preceding chapters have presented the considerations and analysis that led the Task Force to the recommendations being made. The recommendations deal basically with the following two issues:

1. What is an appropriate level of charge for the use of Crown timber?
2. What is the fairest and most efficient method of collecting such timber revenue?

The recommendations are summarized diagrammatically in Figures III and IV. Figure III deals with the level of revenue, giving full consideration to the Government's cash flow expenditure to sustain the timber resource and the industry's general ability to pay. Figure IV describes the proposed mechanism to collect the desired level of revenue.

The Level of Charges

In determining an appropriate level of charges, three factors were considered:

- . The industry's ability to pay;
- . The level of charges in other jurisdictions; and
- . The costs incurred by the Ministry of Natural Resources in regenerating and managing the forests in the province.

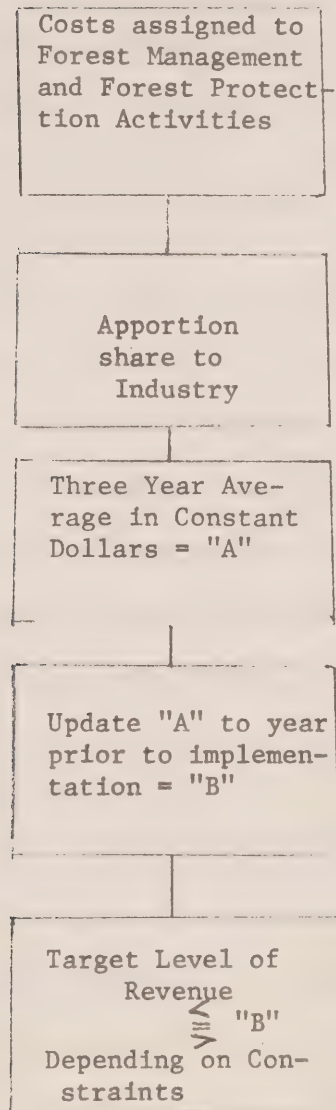
Ideally, the Province should structure the level of charges to recover its costs plus a return; however, the other two factors currently place a constraint in achieving this objective.

If this approach is adopted the industry is likely to feel equitably treated, and develop a spirit of cooperation with the Government. To the extent that the industry assists the Government in holding down the costs to sustain forest production, their costs for Crown timber will be lower. In addition, the assessed industry charges are more likely to continue to be treated as deductible for federal corporate income tax purposes since they are related to the cost of producing the resource.

Referring to Figure III, it is suggested that in assessing the costs incurred by the Ministry of Natural Resources the starting point be the costs assigned to forest management and forest protection activities as published, or to be published, in the Ontario Public Accounts. For reasons which will be explained later, it is proposed that the last three years for which actual costs are available should be used as the base. If this system is implemented for the 1976-77 fiscal year, the last three years for which actual costs are available are 1972-73, 1973-74 and 1974-75 (see Chapter II, Tables XVI and XVII). In recognition that all assigned costs are not incurred for the sole benefit of the forest industry, only that proportion of the costs that can be attributed to the industry should be isolated for consideration (see Chapter II, Table XVIII).

FIGURE III

THE LEVEL OF REVENUE



The three-year average in constant dollars forms the break-even cost level for those three years, but if the system is implemented in the 1976-77 fiscal year, this amount must be updated to 1975-76 dollars to compensate for the forces of inflation. It must also be increased to include the Ministry of Natural Resources' added costs due to progress towards its policy of achieving full regeneration by 1981, but not for any change in costs because of different harvesting levels. For 1976-77 the break-even cost level is calculated to be \$44.4 million.

The Government could decide to collect more revenue than this break-even figure if a return is desired, or collect less if it is felt that the economic conditions of the industry and its importance to the provincial economy justify a subsidy. The Task Force analyses of the industry's current ability to pay, its earnings records, its competitive position, and the level of charges in other provinces led to the recommendation that:

FOR THE FISCAL YEAR 1976-77 THE TARGET LEVEL
OF REVENUE SHOULD BE \$40, MILLION.

This figure implies approximately a 33% increase over the level adopted by the interim revision of 1974. However, in constant dollars the increase is less than 1%. It should also be noted that this target level of revenue assumes a harvest equal to the average of the 1972-73, 1973-74, 1974-75 harvest and that the forest industry will be operating at normal levels; that is, neither in the boom nor bust phase of its cycle.

The System

Figure IV outlines the mechanism which is believed to raise the desired revenue in a way that is conducive to optimum forest utilization and management, yet is sensitive to the industry's ability to pay. Having considered and tested alternative approaches, for the reason discussed above, the Task Force feels that, given Ontario's situation and condition,

A SUITABLE APPROACH IS TO CONTINUE TO LEVY A TENURE CHARGE, BONUS AND BID, AND CROWN DUES AFTER SOME RESTRUCTURING SO AS TO BETTER CONFORM WITH THE DESIRED OBJECTIVES.

Tenure

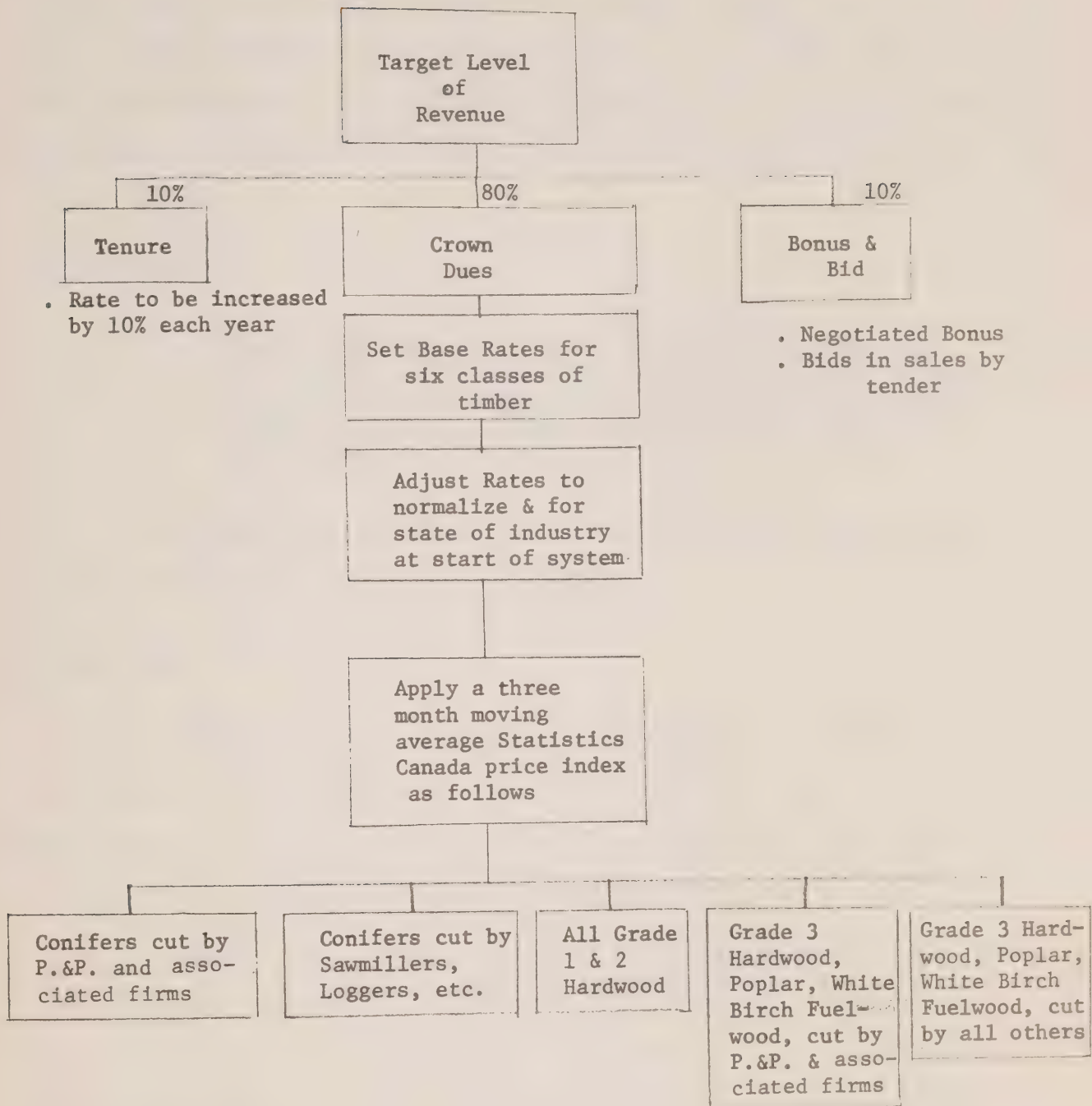
Tenure should continue to be assessed on the area of productive forest land under licence. Companies derive benefits from holding large tracts of land under licence. Therefore, the tenure charges should be at a level that relates to the benefits received, and at the same time discourages companies from holding land beyond their reasonable requirements.

IT IS RECOMMENDED THAT A SINGLE TENURE CHARGE BE ESTABLISHED, REPLACING THE EXISTING FOREST PROTECTION CHARGE AND FOREST MANAGEMENT CHARGE AND THAT THE RATE BE INITIALLY SET TO RECOVER AN AMOUNT EQUIVALENT TO 10% OF THE TARGET LEVEL OF REVENUE.

Given the current level of productive land under licence the tenure charge would amount to approximately \$52 per productive square mile. It is recommended that between review periods, the tenure charge be increased annually at the rate of 10%. This rate

THE SYSTEM

FIGURE IV



To be indexed using:

(Composite of Lumber, Spruce, East of Rockies, P.&P. Mills)

(Lumber, Spruce, East of Rockies)

(Maple Lumber)

(Pulp & Paper Mills)

(Maple Lumber)

of increase would serve to keep the tenure charge closer to the rising forestry costs experienced by the Ministry of Natural Resources, and encourage licensees to release any lands they may be holding in excess of their current and projected requirements.

Bonus and Bid

IT IS RECOMMENDED THAT A BONUS SHOULD CONTINUE TO BE NEGOTIATED, BUT REFLECT IN A MORE MEANINGFUL WAY GEOGRAPHIC ADVANTAGES AND SUPERIOR QUALITY TIMBER. ALSO, IN THE CASE OF SALE BY TENDER THE BID SHOULD BE RETAINED.

As an objective the bonus and bid combined should provide about 10% of the revenue to be raised.

Crown Dues

The recommended system leaves about 80% of the desired revenue, or \$32 million, to be collected as Crown dues. The Task Force believes that the classifications (Conifers, grade 1, 2 and 3 hardwood, poplar, white birch and fuelwood) and the relation between the rates adopted in the 1974 revision were both fair and reasonable and should be maintained. Given the level of revenue to be recovered from Crown dues, the relation between the rates for the six classes and the average volume of timber harvested in the last three years, the base rates for each species can be established.

A three year average was used to measure both the costs and timber harvest in order to smooth any variations that may occur in both costs and harvesting level. It is recognized

that the Ministry of Natural Resources does not adjust its work program and expenditures immediately with a change in level of harvest; therefore, the averaging should tend to compensate for this lag.

As indicated above, both the pulp and paper and especially the sawmilling sector of the industry experience boom and bust periods. In order to make the level of charges responsive to the industry's ability to pay and at the same time provide some measure of protection to the level of charges from the eroding effects of inflation, the Task Force recommends that:

THE CROWN DUES BE INDEXED, WHERE FEASIBLE,
BY THE INDUSTRY SELLING PRICE OF THE PRODUCTS
FOR WHICH THE TIMBER IS USED.

Specifically it is recommended that the six classes of timber be indexed as follows:

Conifers

1. In recognition that conifers are used by both the sawmilling and the pulp and paper sectors two distinct indices should be used, depending on the sector the licensee belongs to. Conifer cut by pulp and paper companies and associated companies ("associated" to have the meaning assigned in the Income Tax Act (Canada)) should be indexed using a composite index of Lumber, Spruce (East of the Rockies) and Pulp and Paper Mills selling prices. This composite index should be weighted in proportion to the use the timber is put to by the sector; tha

is, if the conifer harvested by this sector flows 10% and 90% to sawmills and pulp and paper mills respectively then the composite index should reflect this by being composed of 10% Lumber, Spruce (East of the Rockies) and 90% Pulp and Paper Mills industry selling prices.

Conifers cut by sawmill operators, loggers and other non-pulp and paper mills or their affiliates should be indexed using the Lumber, Spruce (East of the Rockies) selling price.

Grand 1 & 2 Hardwood

2. All grade 1 & 2 hardwood should be indexed by the Maple Lumber selling price, since most of this wood is used for lumber production, and maple is representative of hardwood lumber price fluctuations.

Grade 3 Hardwood, poplar, white birch and fuelwood

3. Grade 3 hardwood, poplar, white birch and fuelwood are used for production of both building products and pulp and paper; therefore, the Pulp and Paper Mills selling prices should be used to index the rates of these classes when harvested by pulp and paper companies and their related companies; the Maple Lumber selling price should be used for all other licensees.

The suggested indices all have a 1961 base of 100; therefore, each is currently reported at a level well over 100, reflecting the general price escalation since 1961. The base rates calculated above did not make any adjustment for the

position of the industry in its business cycle at the time the new system is implemented.¹ Making an initial adjustment to the base rate to compensate for each sector's position in its business cycle and to affect a new base for the applicable price index will create a new base rate. This new base rate when factored by the 1961 price index base for the first and all subsequent periods will yield the rate in effect for the period in question.

Frequency of Adjustment

Statistics Canada has indicated that it would make available with a minimal lag, the required price indices in advance of publication. For example, January price statistics could be made available by the end of February and used in calculating the March billing by the Ministry of Natural Resources.

IT IS RECOMMENDED THAT THE MINISTRY OF NATURAL RESOURCES' CURRENT PRACTICE OF BILLING MONTHLY BE CONTINUED, TO MINIMIZE THE LAG IN ADJUSTING CROWN DUES IN RESPONSE TO CHANGES IN INDUSTRY PRICES, THE INDEXING FACTOR SHOULD INCLUDE THE LATEST PRICE DATA.

To discount for random fluctuations in any particular month, the indexing factor for each month's billing should be the simple average of the available preceding three months price statistics. For example, the indexing factor for August would

1. The Task Force has asked the private sector's assistance in assessing this aspect. However, there are a number of measures that could be used to measure the phase of the business cycle, the sawmills and pulp and paper mills are experiencing at any particular time. These include:

- a. the trend in price fluctuations and the absolute level of prices of the industry's products;
- b. relative profitability; and
- c. capacity utilization level.

be the average of the April, May and June price indices. For September, April would be dropped and July would be added in calculating the indexing factor.

Implementation Date

If the Task Force's recommendations are accepted, the mechanism to implement them can be established in time to be made effective at the beginning of the next fiscal year if the requisite resources are made available to the Ministry of Natural Resources.

The recommended system does have the flexibility to be implemented retroactively. It may be desirable to implement the system retroactively, effective May 1, 1974 - the date on which the interim rates were applied. If this is done, the charges applicable for each license would need to be recalculated. It is expected that over the interim period, 1974-1976, the new charges would involve slightly higher costs to the pulp and paper sector and lower costs to the sawmilling sector in response to the trends in the price levels since May, 1974.

Retroactive billing could be used to make the new system more attractive to the industry if applied so that any difference in the level of Crown dues between the interim rates and the new rates was forgiven if it resulted in higher costs, and credited against future charges if the new rates would have meant lower charges over the interim period. This option would in effect result in retroactive assistance

to the sawmilling sector, at an estimated cost to the Government of between \$0.5 and \$1 million. However, it must be recognized that this option would involve an additional degree of administrative cost which may make the effort impractical.

Periodic Review and Adjustment

Although the system being recommended is not radically new, it does represent a substantial departure from the old system of levying Crown charges. It is expected to meet a number of performance requirements. The Task Force feels confident that, by and large, these requirements will be satisfied. However, there may be some anomalies not recognized in our study and so it is recommended that:

THE PERFORMANCE OF THIS NEW SYSTEM SHOULD BE MONITORED IN THE BEGINNING SO THAT IF THE RESULTS ARE NOT AS EXPECTED, ADJUSTMENTS CAN BE EFFECTED.

In addition it is recommended that:

A COMPLETE REVIEW SHOULD BE UNDERTAKEN AFTER EACH FIVE-YEAR PERIOD TO ESTABLISH A NEW COST BASE AND REASSESS THE INDUSTRY'S ABILITY TO PAY.

Conclusion

The target level of revenue being recommended represents an increase of less than 1%, in real terms, over the level established by the 1974 revision. This level of charges would maintain Ontario's competitive position vis-a-vis the other provinces.

The system being recommended to raise this revenue does not represent a radical departure from the existing system. Basically, the recommendation is to retain the present system with some modifications introduced to achieve the desired results.

- . A single tenure charge replacing the existing forest protection and management charges will simplify the system.
- . A higher level of tenure charge will encourage companies to surrender any land under long-term licence that is beyond their anticipated requirements.
- . Increasing the revenue from the negotiated bonus and bid will serve to better reflect geographic advantages and quality of timber, thus producing a fairer overall distribution among companies.
- . The indexing mechanism will serve two purposes. First, it will protect Government revenue from inflation. Second, it adjusts the charges in response to the cyclical nature of the industry. For example, a 10% drop in the price index will result in a 10% drop in the level of Crown dues.

APPENDIX

COMPUTER SIMULATION MODELS

Computer Simulation of Logging Tax and Conversion Return

The model used was a deterministic, structural simulation of a selected sample of companies from the Ontario forest-based industry. Sawmill, independent loggers and large pulp and paper companies were chosen to satisfy certain characteristics pertaining to spatial location, ownership, breadth of activities, etc. A main concern was to exclude corporations having significant out-of-province or non-forest-related activities. In many cases this severely restricted our choice and hinted at some of the administrative difficulties that would be unavoidable. From each of our sample companies 32 data items were compiled from the financial statements and tax returns. With this data the simulation model was able to recreate the complete tax bases of the logging tax and the conversion return for the years 1969 to 1973.

The tax base for the logging tax was based on taxable income with various modifications as can be observed below.

$$\begin{aligned} \text{LOGGING TAX BASE} &= \text{TAXABLE INCOME} + \text{PRIOR YEARS LOSSES} \\ &+ (P1) \text{ WOOD PURCHASED PRIVATELY} \\ &- (P2) \text{ ORIGINAL COST OF ASSETS} \\ &+ \text{CROWN CHARGES} \\ &+ (P3) \text{ TOTAL OPERATING COSTS \& EXPENSES} \end{aligned}$$

The terms P1, P2 and P3 were parameters that were continually adjusted during the testing period. A percentage, P2, of the original cost of assets was used as a processing allowance or

incentive. The percentage was predetermined as 0% for loggers and 8% for all others. The Task Force decided that the logging tax would be tested as the sole revenue-generating mechanism; thus the Crown timber charges had to be removed from the system. A percentage, P1 of the cost of wood purchased privately, reflecting the equivalent of Crown charges on such timber was added back to the tax base. Finally the Task Force felt that certain costs and expenses would not be allowed - depending on their nature; to approximate this a percentage, P3, of total deductions was not permitted.

The tax base for the conversion return was modified slightly from the logging tax base as described above. The formula detailed below shows the Province receiving the residual profit after allowing the corporation a return on capital and/or sales.

CONVERSION RETURN BASE	=	SALES
	-	(P2) COSTS & EXPENSES
	+	CROWN CHARGES
	+	(P2) PRIVATE WOOD PURCHASES
	-	(P3) SALES
	-	(P4) ORIGINAL COST OF ASSETS

The parameter, P2, is used to disallow a certain percentage of costs and expenses. As in the logging tax base, the Crown dues actually paid must be re-added to the base in order to simulate a tax structure without Crown dues. The parameters, P3 and P4, reflect the rate of return given back to the corporation.

Both the logging tax base and the conversion return base received a further adjustment before the tax was calculated. The purpose of this adjustment was to eliminate taxing the companies on their profits from non-Crown-cut trees. Assuming equal profitability of private and Crown wood, the ideal solution would be to multiply the tax bases by the fraction of Crown wood input over total wood input for each company. In the absence of such detailed data the Task Force decided to use an industry average figure for all companies.

Using the formulas just explained, the taxes payable for each of the sample companies was computed for each of the 5 years by the simulation model. The next step was to 'blow-up' the sample results to the whole industry. This was done by multiplying the sample taxes by the fraction of total industry Crown wood cut over the sample Crown wood cut.

The running of the simulator required careful selection of the parameter values in order to collect the desired level of revenue and to satisfy as many of the criteria for acceptability as possible. The first few runs served only to narrow the selection of the parameters; the discussion here will commence with the first set of meaningful results.

With P1 and P2 set at 10% and a tax rate of 20% the logging tax did not generate sufficient revenue. This was due to the low taxes paid by the pulp and paper sector. The parameters were re-adjusted and the tax rate increased to 50% without solving this problem. It became apparent that no combination of parameter values could collect the desired amount while levying an equitable and fair tax burden on

the three sectors which comprise the forest-based industry.

The conversion return formula was simulated with P2, P3 and P4 set at 95%, 1% and 4% respectively. The revenue generated was acceptable but the tax burden was again heavily biased in favor of the large pulp and paper companies. As was the case with the logging tax, this problem could not be overcome by adjusting the parameter values.

In summary the results from the simulation model were discouraging. The data compilation and sampling problems illustrated that administrative costs would be extremely high. The results of the model showed the inequality of the tax burden and the high tax rate (50%) or low rate of return allowed (1% and 4%) necessary to generate sufficient revenue. These rates would make the deductibility of logging tax or conversion return for federal tax purposes very doubtful, and indeed very unattractive to the industry.

Computer Simulation of Stumpage System

The computer model used was a deterministic, structural simulation of the entire forest-based industry. The data base was the amount of Crown wood cut during the years 1969 to 1973. This base was broken down into quarters and by the six classes of wood recognized by the Ministry of Natural Resources. The present system of Crown stumpage requires this data; hence, the data collection and verification was relatively simple. For the purposes of the simulation model the Crown wood cut was allocated among the three sectors of the forest-based industry- loggers, saw-mills and pulp and paper companies. In order to assess total revenue-generating ability, the model also incorporates tenure, bonus and bid.

The purpose of the simulation model was to test alternative stumpage formulas for their ability to collect a level of revenue in a manner most consistent with the criteria outlined in the report. The main change from the present stumpage collection was the addition of an index to reflect industry health. The search for an indexing mechanism that would reflect the separate profitability cycles of the lumber sector and the pulp and paper sector was a difficult task. The Task Force was also conscious of the time lag and administrative properties.

The data available permitted indexing to be done on a quarterly basis for the simulation, lagged one quarter. For each species of wood the stumpage charge for each period was determined by multiplying three factors together: cunits of

wood cut, base stumpage rate, and index. The stumpage charge was allocated between lumber and pulp and paper companies (loggers were included with sawmillers to form the lumber sector) according to the proportion of crown-wood cut by each sector. In this way the simulator was able to compute stumpage, allocate between industry sectors and then aggregate for the six classes of wood to arrive at the sector's burden for each quarter.

To create a point of reference, the forest simulation was run with no indexing mechanism at all. The results showed that stumpage collections varied slightly with industry health, due to the response in wood cut. This response was judged to be insufficient for the goals of the Timber Task Force.

The first indexing system used the selling-prices of the end-products most closely related to each of the six wood groups. This is set out in more detail in the body of the main report. Five of the six wood classes were easily identifiable as to end-usage; selection of appropriate selling price indices was straightforward. The other wood group, conifers, posed more of a problem because the tree can be turned into lumber or alternately processed into pulp. There are no quality distinctions that would determine the actual usage of a conifer standing in the forest. Proper treatment of conifer indexing is essential because conifer stumpage accounts for over 50% of all Crown dues from the forest-based industry. It was decided to use a composite index weighted by a pulp and paper index (75%) and a spruce index (25%). These percentages are based on the actual usage of conifers in Ontario.

The simulator was run and the output pointed to a lack of sensitivity in the indexing mechanism. For example, in 1970 the lumber industry was slumping badly but the pulp and paper market was steady. The results showed a 8.2% and a 9.6% decrease in the burden on the lumber and the pulp and paper sectors, respectively, relative to the no-indexing simulation. The use of a composite index prevented the lumber burden from falling lower and actually caused a drop in the pulp and paper burden during a stable period in its profitability cycle.

It was decided to abandon the composite index and to adopt two separate indices that would recognize the end-usage of each conifer. The administration of such a dual index was the major obstacle to this idea. All Crown trees are scaled by the field staff of the Ministry of Natural Resources before they have been hauled from the forest. As stated earlier, there is no way to predict the destination of a conifer at this stage. A scheme was proposed whereby the Ministry of Natural Resources would monitor all wood flows from the forests to the mills in order to establish end-usage for the conifers. This idea was considered carefully and finally rejected because of the high cost of administration. At this time the Task Force also investigated several alternatives to selling price indices, such as mill capacity, reported profits and employment, without any success. Finally a system was agreed upon that would categorize all Crown license-holders as either sawmill-loggers or else pulp and paper and related companies. The conifers cut by each license-holder would be indexed with a selling price according to the classification.

It was thought that this method would accurately reflect the end-usage of the conifer trees.

This new indexing system was tried on the computer simulator and the results were much more encouraging. In 1970 the saw-mills' burden fell by 16.6% and the pulp and paper companies paid only 4.7% less. This improvement in the profitability response was also present in the other years as well. The indexing also protected the Crown dues from inflation because the selling price trends of the wood products also reflected general price levels trends.

This concludes the technical appendix on the computer simulation models. The importance of the simulation can be seen by reading the main report and noting the conclusions that were drawn from the results outlined in the preceding pages.

